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Announcement 1914-1915

FORTY-SIXTH YEAR



Durham, New Hampshire
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The
New Hampshire College
of
Agriculture and the Mechanic Arts
Bulletin

Durham, New Hampshire

APRIL, 1914

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1914

JANUARY.							FEBRUARY.							MARCH.							APRIL.						
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1915

JANUARY.							FEBRUARY.							MARCH.							APRIL.						
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COLLEGE CALENDAR.

1914.

Entrance examinations, beginning at	
8.30 a. m.	<i>Tuesday, September 8.</i>
Registration day. First semester begins	<i>Wednesday, September 16.</i>
Address to student body	<i>Thursday, September 17.</i>
Address to freshmen by the president	<i>Friday, September 18.</i>
Stated meeting of trustees	<i>Wednesday, October 14.</i>
College closes at 4 p. m.	<i>Tuesday, December 22.</i>

1915.

College opens at 8 a. m.	<i>Tuesday, January 5.</i>
Stated meeting of trustees	<i>Wednesday, January 13.</i>
Mid-year examinations	<i>Thursday, January 28, through Tuesday, February 2.</i>
Registration day. Second semester begins	<i>Thursday, February 11.</i>
Stated meeting of trustees	<i>Wednesday, April 14.</i>
College closes at 4 p. m.	<i>Tuesday of Fast Day week.</i>
College opens at 8 a. m.	<i>Tuesday following Fast Day.</i>
Graduation of two-year class . . .	<i>Wednesday, May 19.</i>
Senior examinations completed at 4 p. m.	<i>Tuesday, June 8.</i>
Final examinations	<i>Wednesday, June 9, through Monday, June 14.</i>
Baccalaureate sermon at 10.45 a. m. .	<i>Sunday, June 13.</i>
Prize drill, in the armory at 8 p. m. .	<i>Monday, June 14.</i>
Class day. Stated meeting of trustees	<i>Tuesday, June 15.</i>
Commencement day	<i>Wednesday, June 16.</i>
*Entrance examinations, beginning at 8.30 a. m.	<i>Tuesday, June 22.</i>

*Candidates taking the June entrance examinations have an opportunity by so doing to compete for the Valentine Smith scholarship. See page 10.

BOARD OF TRUSTEES.

HIS EXCELLENCY, GOV. SAMUEL D. FELKER, A.M., LL.D., *ex-officio*.

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HON. WALTER DREW, Colebrook.

Aug. 30, 1902, to Aug. 30, 1914.

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Jan. 16, 1906, to July 1, 1916.

HON. GEORGE H. BINGHAM, A.B., LL.B., Manchester.

Dec. 2, 1908, to Dec. 2, 1914.

HON. RICHARD W. SULLOWAY, A.B., Franklin.

May 13, 1909, to Oct. 9, 1915.

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Sept. 1, 1911, to Sept. 1, 1914.

HON. WILLIAM H. CALDWELL, B.S., Peterborough.

July 29, 1912, to July 29, 1915.

HON. JOHN W. PRENTISS, Alstead.

Jan. 10, 1914, to June 14, 1916.

HON. WILLIS McDUFFEE, A.B. Rochester.

Jan. 10, 1914, to June 14, 1916.

HON. JAMES A. TUFTS, A.B., Exeter.

Jan. 10, 1914, to June 14, 1916.

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HELEN B. THOMPSON, M.S., A.M., *Dean of Women*.

WALTER M. PARKER, A.B., *Treasurer*.

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CHARLES W. STONE, A.M., *College Farmer*.

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ANNIE J. MORGAN, *Manager of Book Store*.

CLARA M. RIDGWAY, *Secretary to the President*.

BEATRICE M. RICHMOND, *Bookkeeper*.

RENA M. LOWE, *Stenographer*.

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WILLARD J. FISHER, PH.D., *Professor of Physics.*

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ORMOND R. BUTLER, PH.D., *Professor of Botany.*

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OTTO L. ECKMAN, B.S. (Agr.), *Professor of Animal Husbandry.*

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HELEN B. THOMPSON, M.S., A.M., *Professor of Home Economics and Dean of Women.*

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FRANK E. MCKONE, B.S., *Assistant Professor of Mechanical Engineering.*

GEORGE A. PERLEY, M.S., *Assistant Professor of Physical Chemistry.*

*FRANK APP, B.S., *Assistant Professor of Agronomy.*

*On leave of absence.

W. E. STOKES, M.S., *Assistant Professor of Agronomy.*

LEON W. HITCHCOCK, B.S., *Assistant Professor of Electrical Engineering.*

FREDERICK W. WHITMAN, A.B., *Assistant Professor of Modern Languages.*

CHARLES C. STECK, A.B., M.S., *Assistant Professor of Mathematics.*

CAROLINE A. BLACK, PH.D., *Assistant Professor of Botany.*

ROBERT V. MITCHELL, B.S., *Assistant Professor of Animal Husbandry in charge of Poultry.*

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DAVID LUMSDEN, *Instructor in Floriculture and Landscape Gardening.*

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JAMES H. PHILBRICK, *Instructor in Woodworking and Foundry Work.*

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HAROLD H. SCUDDER, B.S., *Instructor in English.*

HERBERT H. PALMER, S.B., *Instructor in Physics.*

JAMES H. CAHILL, *Instructor in Machine Work and Forging.*

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H. CHESTER HOLDEN, B.S., *Assistant in Chemistry.*

CHARLES H. BATCHELDER, B.S., *Assistant in Zoology.*

MARION E. TEMPLETON, B.A., *Assistant in Botany.*

NEW HAMPSHIRE AGRICULTURAL EXPERIMENT STATION.

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Nashua

HON. W. H. CALDWELL, B.S.,

Peterborough

HON. J. W. PRENTISS,

Alstead

HON. J. A. TUFTS, A.B.,

Exeter

PRES. E. T. FAIRCHILD, A.M., LL.D., *ex-officio*

Durham

THE STATION STAFF.

EDWARD T. FAIRCHILD, A.M., LL.D., *President, ex-officio.*

JOHN C. KENDALL, B.S., *Director.*

FREDERICK W. TAYLOR, B.Sc. (Agr.), *Agronomist.*

B. E. CURRY, A.B., *Chemist*.
 FRED RASMUSSEN, B.S.A., *Dairyman*.
 W. C. O'KANE, A.M., *Entomologist*.
 J. H. FOSTER, B.S., M.F., *Forester*.
 J. H. GOURLEY, B.S., *Horticulturist*.
 O. R. BUTLER, Ph.D., *Botanist*.
 J. M. JONES, B.S. (Agr.), A.M., *Animal Husbandman*.
 C. W. STONE, A.M., *Farmer and Vice-Director*.
 W. H. WOLFF, M.S., *Assistant Horticulturist*.
 DAVID LUMSDEN, *Assistant in Floriculture*.
 T. O. SMITH, A.B., *Assistant Chemist*.
 CAROLINE A. BLACK, Ph.D., *Assistant Botanist*.
 *FRANK APP, B.S., *Assistant Agronomist*.
 W. E. STOKES, M.S., *Assistant Agronomist*.
 C. H. HADLEY, JR., B.S., *Assistant Entomologist*.

Assistants to the Staff.

MABEL HODGKINS, A.B., B.S., *Librarian*.
 MIRIAM L. HOBBS, *Purchasing Agent*.
 BEATRICE M. RICHMOND, *Bookkeeper*.
 LAURA B. BICKFORD, *Stenographer*.
 ELIZABETH E. MEHAFFEY, *Assistant Librarian and Mailing Clerk*.
 JANET E. McDONALD, *Stenographer*.

*On leave of absence.

HISTORICAL SKETCH.

The New Hampshire College of Agriculture and the Mechanic Arts was created by an act of the New Hampshire legislature in 1866 and was established at Hanover as a state institution, in connection with Dartmouth College. In its foundation the state legislature had accepted the conditions of an act of the federal congress of July 2, 1862, entitled "An act donating public lands to the several states and territories which may provide colleges for the benefit of agriculture and the mechanic arts." The state had accepted the land grant three years earlier, July 9, 1863.

In 1893 the college was moved from Hanover to Durham. This action followed the death of Benjamin Thompson of Durham, a farmer, who died January 30, 1890, and left his entire estate, with a few minor reservations, to the college. The legislature accepted this bequest March 5, 1891, and appropriated the necessary money for the first buildings.

Mr. Thompson wrote in his will, "My object being mainly to promote the improvement of agriculture, though willing that the college to be established should also provide for the mechanic arts, it is my will that the institution to be established by the state . . . shall be called and designated . . . The New Hampshire College of Agriculture and the Mechanic Arts, if that shall be the wish of the state; and that in addition to the instruction to be given therein, as provided by my said will, there shall be taught only such other arts or sciences as may be necessary to enable said state to fully avail itself of said donation of lands by the government in good faith, which two branches of instruction shall be the leading objects of said institution or college."

A few days before the state accepted this bequest of Mr. Thompson the legislature further provided for the college by

accepting the provisions of an act of congress known as the Morrill Bill. This legislation made available federal appropriations "for instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematical, physical, natural and economic science, with special reference to their applications in the industries of life, and to the facilities for such instruction."

Although the college was able to make use of the Thompson land as early as 1893, it was not until 1910 that the income from this endowment of almost \$800,000 became available. At present the college has an annual income from the Thompson funds of nearly \$32,000, the moneys which are available as the result of the acts of congress referred to, and the biennial appropriations of the state legislature.

The college administration is in charge of a board of thirteen trustees. The governor of the state and the president of the college are *ex-officio* members; the college alumni elect two, and the others are appointed by the governor with the advice and consent of the council.

A branch of the college, known as the New Hampshire Agricultural Experiment Station, was established by the state, August 4, 1887, under an act of congress of March of that year. Its purpose is to acquire agricultural knowledge and to bring its information to the people of the state. The station is actively engaged in this work not only in Durham but throughout the commonwealth. Members of the agricultural faculty of the college serve on the station staff and there are special agents who are engaged exclusively in field work.

When the college came to Durham it had but twenty-seven students and a faculty of but thirteen members. At present its students number approximately four hundred and its faculty fifty. Its growth, at first slow, has been constant always, and in the last five years the college has doubled the number of its students and tremendously increased its equipment.

GENERAL INFORMATION.

Situation.—Durham, the home of the college, is on the Portland division of the Boston and Maine railroad, sixty-two miles from Boston and five miles from Dover.

Courses.—The college is a part of the public school system of the state, continuing the work of the high school, and its courses are open to both men and women. In accord with the origin and function of the college its courses are essentially practical, leading directly to the student's preparation for a successful livelihood.

I. Agriculture.

- a.* Four-Year Courses.
 - 1. Animal Husbandry and Dairying.
 - 2. Forestry.
 - 3. Horticulture.
 - 4. General Agriculture and Agricultural Teaching.
- b.* Two-Year Course in Agriculture.
- c.* Five-Week Course in Dairying.
- d.* Four-Week Course in Fruit Growing.
- e.* Farmers' One-Week Course.

II. Arts and Science.

- a.* General Arts and Science.
- b.* Home Economics.
- c.* Mechanic Arts for Teachers.

III. Engineering.

- a.* Chemical Engineering.
- b.* Electrical Engineering.
- c.* Mechanical Engineering.

Tuition and Fees.—Tuition is \$60 a year; fees, which include all charges commonly considered extras, except those for breakage and damage to college property, are \$20 a year. They are payable in advance in two equal instal-

ments, one on the first day of each semester. By vote of the trustees, all members of the senior class are assessed a graduation fee of \$5.00.

Scholarships.—Scholarships are awarded each semester at the discretion of the faculty to resident students of New Hampshire. They may be forfeited at any time for misconduct and will not be awarded, except by special permission of the president, to students in the four-year courses who have failed to secure an average grade of sixty or over in the previous semester. They are given for the purpose of aiding deserving students and will be withdrawn from those who use intoxicating liquor or tobacco.

Conant Scholarships.—There are twenty-seven Conant scholarships, each paying tuition, \$60; fees, \$20; cash \$20,—total, \$100. These are assigned under the following conditions:

They are to be given to young men taking agricultural courses.

Each town in Cheshire County is entitled to one scholarship, and Jaffrey is entitled to two.

They will be reserved for their respective towns until August 1 of each year. Those not taken by students from Cheshire County, and those in excess of the number of towns, will then be assigned to agricultural students from other parts of the state, and may be divided at the discretion of the president.

Senatorial Scholarships.—There are twenty-four senatorial scholarships, one for each senatorial district. Each scholarship is to pay tuition of \$60. Senatorial scholarships not filled may be assigned to students from other localities at the discretion of the faculty; they are open to students in all courses.

Grange Scholarships.—Each subordinate and Pomona grange in New Hampshire has the privilege of appointing one student annually to a free scholarship in any of the four-year or two-year courses in the college. Each scholarship

is to pay the tuition of \$60. The method of appointment is entirely at the option of the grange; it may be by election, competitive examination, or otherwise. Holders of these scholarships need not be members of the grange, but must be resident within the state.

Valentine Smith Scholarships.—Through the generosity of the late Mr. Hamilton Smith of Durham, the sum of \$10,000 has been given to the college to establish the Valentine Smith scholarships.

“The income thus accruing to the college shall be given to the graduate of an approved high school or academy who shall, upon examination, be judged to have the most thorough preparation for admission to the college; *provided*,

“That if the student receiving this scholarship shall at any time prove unworthy, in the judgment of the faculty, by reason of defective scholarship or character, he shall forfeit his claim to the student most deserving; and

“That if the student receiving this scholarship shall cease to be a member of the college, the income from this fund, for the unexpired term, shall be awarded to the student most deserving in character and scholarship.”

By vote of the faculty, these scholarships will be forfeited by failure to obtain an average grade of 75 per cent. for any semester. These scholarships yield \$400 annually or one hundred dollars to each holder. Competitive examinations for this scholarship will be held at the college in June and at no other time. Applicants must present themselves at the registrar's office at 8.00 a. m., June 23, 1914. They are not restricted to residents of New Hampshire.

Prizes.—*Bailey Prize.*—Dr. C. H. Bailey of Gardner, Mass., and E. A. Bailey, B.S., of Keene, N. H., offer a prize of ten dollars for proficiency in chemistry.

Erskine Mason Memorial Prize.—Mrs. Erskine Mason of Stamford, Conn., has invested one hundred dollars as a memorial to her son, a member of the class of 1893, the income of which is to be given, for the present, to that member

of the senior class who has made the greatest improvement during his course.

Chase-Davis Memorial Medals.—In the spring of 1909 the Glee Club voted to present a gold and a silver medal yearly to the college in memory of Carl Chase, '09, of Webster, an enthusiastic member of the New Hampshire football team and the Glee Club, and of John Worthen Davis, '11, of Concord, who were drowned in Great Bay, December 7, 1908.

According to the terms of this gift, the gold medal is to be awarded to the senior who has won an "N. H." and stands highest in his studies, and the silver medal is to be awarded to the senior who has won an "N. H." and stands second in his studies. These medals are for excellence in athletic competition primarily, and the number of times a man wins an "N. H." during his college career shall be of importance in making the award.

Individual Drill Prizes.—*First*—A gold medal given by the college. *Second*—A silver medal given by the college. *Third*—A bronze medal given by the college.

Junior Officer's Prize.—A saber, with belt complete, given to the junior cadet officer who excels in executing certain required movements or evolutions with a company.

Alumni Trustee Prizes.—For excellence in debate. Offered by H. L. Boutwell, of Malden, Mass., and E. H. Wason, of Nashua, N. H., alumni trustees. The contest will be held commencement week, June, 1914, between class teams of three each. The prizes are to be awarded as follows: Two first prizes of \$25 each for individual excellence; two second prizes of \$15 each for individual excellence; two prizes of \$10 each to the winning teams.

College Aid to Students.—Students obtain considerable financial aid by janitorships, by table work at boarding clubs and by work on the farm and in the greenhouse. They also find employment with the power and service department of the college and with the experiment station.

Students may purchase at cost all books, drawing instruments, materials, etc., at the college book-store in Thompson Hall.

Estimate of Freshman Expenses.—

Tuition.....	Free	\$60.00
Text-books.....	\$12.00 to	20.00
Military uniform for new students.....	20.00 to	20.00
Drawing instruments and materials.....	12.00 to	25.00
Fees.....	20.00 to	20.00
Room rent, including heat and light.....	32.00 to	72.00
Board, \$3.40 to \$4.00 per week, for thirty-six weeks.....	122.40 to	144.00
Total	\$218.40	\$361.00

Expenses of two-year agricultural students are about \$15 less than above schedule.

This total does not include incidentals (such as traveling expenses, laundry, etc.).

Room rent is estimated on the supposition that two students occupy the same room or suite of rooms.

The college has no rooms for men students. Rooms may be obtained either furnished or unfurnished, in buildings under private control, and are for the most part provided with heating apparatus, electric lights and baths.

Women students, unless living at home, are required to room in dormitories provided by the college.

Table board is \$4 to \$4.25 per week and prices for rooms range from \$1.25 to \$2 per week for thirty-six weeks. Rooms will be assigned to old students in order of their seniority and to new students according to their date of application. Applications for rooms should be made to the dean.

Other expenses are the same as for men students except for military uniform.

Registration.—Undergraduate students are required to register before 4 p. m. on the first day of each semester.

Every former student registered after the first day of any semester shall be charged for such registration a fine of one dollar for the first day and fifty cents additional for each succeeding day, to be remitted only by the president upon presentation of a substantial excuse for the delay.

Rules of Conduct.—The dean of the college has general supervision of registration, attendance, election of studies and removal of entrance conditions. The regulations of the college concerning such matters are given in detail in the "Student Rules," copies of which may be obtained of the registrar.

Warnings and Reports of Standing.—Warnings of unsatisfactory work are sent to parents and guardians near the middle of each semester.

Reports of standing are sent to parents and guardians at the close of each semester.

Attendance at Convocation and Military Drill.—Attendance at convocation is required of all students, and attendance at military drill is required of all male students, unless members of the senior class or unless excused on account of physical disability. Certificates of disability must be obtained of the physician designated by the college, and must be renewed annually.

Military Department.—This department is in charge of an officer of the United States regular army, detailed by the war department, as professor of military science and tactics. Military instruction, which is required by law, is both theoretical and practical, the former having special reference to the duties of the line.

The organization is a battalion of four companies with a band, officered by cadets selected for character, soldierly bearing and efficiency. The federal government has furnished U. S. magazine rifles, model 1898, and equipment. Attention is paid to rifle practice, the government supplying

ample ammunition and target materials, and the college a good range within four minutes' walk of the college buildings, with firing points at 200 and 300 yards. The rolling country in the vicinity of the college furnishes the best opportunities for extended order drill and field exercises, the athletic field for close order drills, and the gymnasium gives ample room for indoor work.

The cadets wear when on duty, and may at other times, a gray cloth uniform as prescribed by standing orders in the War Department. White collars, gloves and waist belts of a standard pattern must be purchased with the uniform and the students have the option of purchasing a high black calf shoe for uniform wear, at a special low price. The cost of a uniform for the new student is \$19.95, not including shoes, and its use may make possible a saving in civilian clothing.

Service in this department is optional for members of the senior class; all other students, excepting those excused by competent authority, are required to attend both drills and recitations. Seniors who elect drill and are appointed cadet officers have their college fees refunded at the end of the semester if their work has been satisfactory. Seniors who elect drill and are not appointed cadet officers are not required to be armed or to drill in the ranks, but will attend all drills and perform such duties as may be required of them.

Upon the graduation of each class the names of those students who have shown special aptitude for military service are reported to the adjutant-general of the army and to the adjutant-general of the state, and they receive a special certificate for military proficiency.

ADMISSION TO FOUR-YEAR COURSES.

METHODS OF ADMISSION.

Admission to New Hampshire College may be obtained by examination, by certificate or by a combination of the two methods. Every candidate must present satisfactory testimonials of good character.

Candidates for advanced standing are admitted on the basis of the work completed at the institutions from which they come.

UNIT REQUIREMENTS.

Candidates for admission to the freshman class must offer a total of fifteen units.

Each unit represents one study of four or five recitations a week for one year.

Of the fifteen units the following are required:

	Agricultural Division.	Arts and Science Division.	Engineering Division.
<i>Group A</i> English,	3	3	3
<i>Group B</i> Foreign Languages (Latin, Greek, French, German),	2	2	2
<i>Group C</i> Mathematics,	2	2	3
<i>Group D</i> Social Science, including History,	1	1	1
<i>Group E</i> Natural Science,	1	1	1
	—	—	—
	9	9	10
<i>Group F</i> *Vocational,			

* The vocational group includes agriculture, domestic science, manual training, drawing, bookkeeping, stenography, and typewriting, provided such preparation is of a quality which meets with the approval of the state superintendent of public instruction.

ELECTIVE SUBJECTS.

Candidates for the Agricultural and Arts and Science Divisions must, *upon entrance to college*, present two other units chosen from groups A to E, one or both to be so chosen as to make up a second major of three units.

Candidates for the Engineering Division must present one other unit chosen from groups A to E.

The four remaining units may be chosen from any of the groups A to F. Entrance examinations, however, will be confined to subjects included in groups A, B, C, D, and E.

A candidate for admission to the Arts and Science Division may substitute for the two units of a foreign language one additional unit in social science and one in natural science.

A candidate for admission to the Arts and Science Division who presents two units of a foreign language may substitute for the two units of mathematics one additional unit in social science and one additional unit in natural science.

It is assumed that two hours of manual training or laboratory work are equivalent to one hour of classroom work.

REQUIREMENTS IN DETAIL.

As a suggestion of the preparation required in the different subjects offered for entrance the following detailed statement is made. It should be understood, however, that the completion in any subject of the work required during one year by the superintendent of public instruction for New Hampshire of an approved high school fully satisfies the requirements for the credit of one unit in that subject.

GROUP A. ENGLISH.

Preparation in English has two main objects: (1) command of correct and clear English, spoken and written; (2) ability to read with accuracy, intelligence and appreciation.

The first object requires instruction in grammar and composition. The second object is sought by means of two lists of books, headed respectively Reading and Study, from which may be framed a progressive course in literature covering four years. A candidate will not be accepted in English whose work is notably deficient in point of spelling, punctuation, phraseology or division into paragraph.

Reading.—The aim of this course is to foster in the student the habit of intelligent reading, and to develop a taste for good literature, by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of that he reads.

Study.—This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. For this close reading are provided a play, a group of poems, an oration and essay.

The first part of the examination will be upon the books prescribed for reading, and the form of the examination will usually be the writing of short paragraphs on several topics which the candidate may choose out of a considerable number. It may include also questions upon grammar and the simpler principles of rhetoric.

The second part of the examination will include composition and those books comprised in the list headed Study. The test in composition will consist of one or more essays, developing a theme through several paragraphs; the subjects will be drawn from the books prescribed for study, from the candidate's other studies, and from his personal knowledge and experiences quite apart from reading.

Requirements, 1914.—In 1914 the examination will be based on the recommendations of the Conference on Uniform Entrance Requirements in English, which met February 22, 1909.

(a) *Reading*.—The following list of books is required for reading in 1914. Two selections are to be taken from each group. Each selection is followed by a semicolon or a period.

Group I. The Old Testament, comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings, and Daniel, together with the books of Ruth and Esther; the Odyssey, with the omission, if desired, of Books I, II, III, IV, V, XV, XVI, XVII; the Iliad, with the omission, if desired, of Books XI, XIII, XIV, XV, XVII, XXI; Virgil's Aeneid. The Odyssey, Iliad and Aeneid should be read in English translations of recognized literary excellence.

For any unit of this group a unit from any other group may be substituted.

Group II. Shakespeare's Merchant of Venice; Midsummer Night's Dream; As You Like It; Twelfth Night; Henry the Fifth; Julius Caesar.

Group III. Defoe's Robinson Crusoe, Part I; Goldsmith's Vicar of Wakefield; Scott's Ivanhoe or Quentin Durward; Hawthorne's House of the Seven Gables; Dickens's David Copperfield or Tale of Two Cities; Thackeray's Henry Esmond; Mrs. Gaskell's Cranford; George Eliot's Silas Marner; Stevenson's Treasure Island.

Group IV. Bunyan's Pilgrim's Progress, Part I; The Sir Roger de Coverley Papers in The Spectator; Franklin's Autobiography (condensed); Irving's Sketch Book; Macaulay's Essays on Lord Clive and Warren Hastings; Thackeray's English Humourists; Selections from Lincoln, including at least the two Inaugurals, the Speeches in Independence Hall and at Gettysburg, the Last Public Address, and the Letter to Horace Greeley, along with a brief memoir or estimate; Parkman's Oregon Trail; either Thoreau's Walden, or Huxley's Autobiography and selections from Lay Sermons, including the addresses on Improving Natural Knowledge, a Liberal Education, and A Piece of Chalk; Stevenson's Inland Voyage and Travels with a Donkey.

Group V. Palgrave's Golden Treasury (First Series),

Books II and III, with especial attention to Dryden, Collins, Gray, Cowper, and Burns; Gray's *Elegy in a Country Churchyard* and Goldsmith's *Deserted Village*; Coleridge's *Ancient Mariner* and Lowell's *Vision of Sir Launfal*; Scott's *Lady of the Lake*; Byron's *Childe Harold*, Canto IV, and *Prisoner of Chillon*; Palgrave's *Golden Treasury* (First Series), Book IV, with especial attention to Wordsworth, Keats, and Shelley; Poe's *Raven*, Longfellow's *Courtship of Miles Standish*, and Whittier's *Snow-Bound*; Macaulay's *Lays of Ancient Rome* and Arnold's *Sohrab and Rustum*; Tennyson's *Gareth and Lynette*, *Lancelot and Elaine*, and *The Passing of Arthur*; Browning's *Cavalier Tunes*, *The Lost Leader*, *How They Brought the Good News from Ghent to Aix*, *Home Thoughts from Abroad*, *Home Thoughts from the Sea*, *Incident of the French Camp*, *Hervé Riel*, *Pheidippides*, *My Last Duchess*, *Up at a Villa—Down in the City*.

(b) *Study*.—Shakespeare's *Macbeth*; Milton's *L'Allegro*, *Il Penseroso*, and *Comus*; either Burke's *Speech on Conciliation with America* or both Washington's *Farewell Address* and Webster's *First Bunker Hill Oration*; either Macaulay's *Life of Johnson* or Carlyle's *Essay on Burns*.

Requirements, 1915–1919.—(a). *Reading*. The following list of books is required for reading in 1915, 1916, 1917, 1918 and 1919.

With a view to large freedom of choice, the books are arranged in the following groups, from each of which at least two selections are to be made, except as otherwise provided under Group I:

Group I. Classics in Translation. Same as in 1913–1914. For any selection from this group a selection from any other group may be substituted.

Group II. Shakespeare.—*Midsummer Night's Dream*; *Merchant of Venice*; *As You Like It*; *Twelfth Night*; *The Tempest*; *Romeo and Juliet*; *King John*; *Richard II*;

Richard III; Henry V; Coriolanus; Julius Caesar*; Macbeth*; Hamlet*.

Group III. Prose Fiction.—Malory's *Morte d'Arthur* (about 100 pages); Bunyan's *Pilgrim's Progress*, Part I; Swift's *Gulliver's Travels* (voyages to Lilliput and to Brobdingnag); DeFoe's *Robinson Crusoe*, Part I; Goldsmith's *Vicar of Wakefield*; Frances Burney's *Evelina*; Scott's *Novels* (any one); Jane Austen's *Novels* (any one); Maria Edgeworth's *Castle Rackrent*, or *The Absentee*; Dickens's *Novels* (any one); Thackeray's *Novels* (any one); George Eliot's *Novels* (any one); Mrs. Gaskell's *Cranford*; Kingsley's *Westward Ho!* or *Hereward, the Wake*; Reade's *The Cloister and The Hearth*; Blackmore's *Lorna Doone*; Hughes's *Tom Brown's Schooldays*; Stevenson's *Treasure Island*, or *Kidnapped*, or *Master of Ballantrae*; Cooper's *Novels* (any one); Poe's *Selected Tales*; Hawthorne's *The House of the Seven Gables*, or *Twice-Told Tales*, or *Mosses from an Old Manse*; a collection of short stories by various standard writers.

Group IV. Essays, Biography, etc.—Addison and Steele's *The Sir Roger de Coverley Papers*, or *Selections from the Tatler and Spectator* (about 200 pages); Boswell's *Selections from the Life of Johnson* (about 200 pages); Franklin's *Autobiography*; Irving's *Sketch Book* (about 200 pages), or *Life of Goldsmith*; Southey's *Life of Nelson*; Lamb's *Essays of Elia* (about 100 pages); Lockhart's *Life of Scott* (about 200 pages); Thackeray's *Lectures on Swift, Addison, and Steele in the English Humourists*; Macaulay's *Lord Clive*, *Warren Hastings*, *Milton*, *Addison*, *Goldsmith*, *Frederic the Great*, *Madame d'Arblay* (any one); Trevelyan's *Life of Macaulay* (about 200 pages); Ruskin's *Sesame and Lilies*, or *Selections* (about 150 pages); Dana's *Two Years before the Mast*; *Selections from Lincoln*, including at least the two *Inaugurals*, the *Speeches in Independence Hall* and at *Gettysburg*, the *Last Public Address*, and the *Letter to Horace Greeley*, together with a brief memoir or

* If not chosen for study under (b).

estimate; Parkman's *The Oregon Trail*; Thoreau's *Walden*; Lowell's *Selected Essays* (about 150 pages); Holmes's *The Autocrat of the Breakfast Table*; Stevenson's *An Inland Voyage*, and *Travels with a Donkey*; Huxley's *Autobiography*, and selections from *Lay Sermons*, including the addresses on *Improving Natural Knowledge*, *A Liberal Education*, and *A Piece of Chalk*; a collection of *Essays* by Bacon, Lamb, DeQuincey, Hazlitt, Emerson, and later writers; a collection of letters by various standard writers.

Group V. Poetry.—Palgrave's *Golden Treasury* (First Series), Books II and III, with special attention to Dryden, Collins, Gray, Cowper, and Burns; Palgrave's *Golden Treasury* (First Series), Book IV, with special attention to Wordsworth, Keats, and Shelley (if not chosen for study under *b*); Goldsmith's *The Traveller*, and *The Deserted Village*; Pope's *The Rape of the Lock*; a collection of English and Scottish ballads, as, for example, some Robin Hood ballads, *The Battle of Otterburn*, *King Estmere*, *Young Beichan*, *Bewick and Grahame*, *Sir Patrick Spens*, and a selection from later ballads; Coleridge's *The Ancient Mariner*, *Christabel* and *Kubla Khan*; Byron's *Childe Harold*, Canto III or IV, and *The Prisoner of Chillon*; Scott's *The Lady of the Lake*, or *Marmion*; Macaulay's *The Lays of Ancient Rome*, *The Battle of Naseby*, *The Armada*, *Ivry*; Tennyson's *The Princess*, or *Gareth and Lynette*, *Lancelot and Elaine*, and *The Passing of Arthur*; Browning's *Cavalier Tunes*, *The Lost Leader*, *How They Brought the Good News from Ghent to Aix*, *Home Thoughts from Abroad*, *Home Thoughts from the Sea*, *Incident of the French Camp*, *Hervé Riel*, *Pheidippides*, *My Last Duchess*, *Up at a Villa—Down in the City*, *The Italian in England*, *The Patriot*, *The Pied Piper*, "*De Gustibus*"—, *Instans Tyrannus*; Arnold's *Sohrab and Rustum*, and *The Forsaken Mermaid*; Selections from *American Poetry*, with special attention to Poe, Lowell, Longfellow, and Whittier.

(*b*) *Study.*—The books provided for study are arranged in four groups, from each of which one selection is to be made.

Group I. Drama.—Shakespeare's Julius Caesar, Macbeth Hamlet.

Group II. Poetry.—Milton's L'Allegro, Il Penseroso, and either Comus or Lycidas; Tennyson's The Coming of Arthur, The Holy Grail, and The Passing of Arthur; the selections from Wordsworth, Keats and Shelley in Book IV of Palgrave's Golden Treasury (First Series).

Group III. Oratory.—Burke's Speech on Conciliation with America; Macaulay's Two Speeches on Copyright, and Lincoln's Speech at Cooper Union; Washington's Farewell Address, and Webster's First Bunker Hill Oration.

Group IV. Essays.—Carlyle's Essay on Burns, with a selection from Burns's Poems; Macaulay's Life of Johnson; Emerson's Essay on Manners.

GROUP B. FOREIGN LANGUAGES.

In the year 1914-1915, preparatory schools will be required to certify with regard to the oral and aural qualifications of their students.

1. French.—Two years are required for preparation in French. Work of the first year should include (1) careful drill in pronunciation, (2) drill upon the rudiments of grammar, (3) abundant translation of simple English prose into idiomatic French, (4) reading of from 100 to 175 pages of French prose, (5) writing French from dictation. Work of the second year should include (1) the reading of from 250 to 400 pages of easy modern prose, (2) constant practice in translating from English into French variations of the text read, (3) frequent paraphrases of the text read, (4) dictation. —2 units

2. German.—Two years are required for preparation in German. Work of the first year should include (1) careful drill in pronunciation, (2) drill upon the rudiments of grammar, such as the inflection of the articles, the common nouns, adjectives, pronouns, and strong and weak

verbs, upon the uses of the prepositions, the modal auxiliaries and the rules of syntax and word order, (3) writing from dictation, (4) the reading of from 75 to 100 pages of prose, (5) translation from English into German. Work of the second year should include (1) the reading of from 150 to 200 pages of prose, (2) constant practice in translating from English into German variations of the text read, (3) dictation, (4) continued drill upon the rudiments of grammar (5) frequent paraphrases of the text read. —2 units.

Students entering from approved schools may receive credit in their certificates for the following work in Greek or Latin:

1. **Greek, Elementary.** Books I and II of Xenophon's *Anabasis*, Books III and IV of the *Anabasis* or their equivalent in other Attic prose. Two years' work. —2 units.

2. **Latin, Elementary.**—Grammar and four books of Caesar. Two years' work. —2 units.

3. **Latin, Advanced.**—Virgil, six books. Cicero, six orations. —2 units.

GROUP C. MATHEMATICS.

1. **Algebra, to Quadratics.**—The four fundamental operations for rational algebraic expressions. Factoring, determination of highest common factor and least common multiple by factoring. Fractions including complex fractions, and ratio and proportion. Linear equations, both numerical and literal, containing one or more unknown quantities. Problems depending on linear equations. Radicals, including the extraction of the square root of polynomials and of numbers. Exponents, including the fractional and negative. —1 unit.

2. **Algebra, Quadratics and beyond.**—Quadratic equations, both numerical and literal. Problems depending on quadratic equations. The formulas for the n th term and

the sum of the terms of arithmetical and geometrical progressions, with applications. The binomial theorem for positive integral exponents.

Pupils should be taught the use of graphical methods and illustrations, particularly in connection with the solution of equations. — $\frac{1}{2}$ unit.

3. Plane Geometry.—The usual theorems and constructions of good text-books, including the general properties of plane rectilineal figures; the circle and measurement of angles; similar polygons; areas; regular polygons, and the measurement of the circle. The solution of numerous original exercises including loci problems. Applications to the measurement of lines and plane surfaces. —1 unit.

4. Solid Geometry.—The usual theorems and constructions of good text-books, including the relations of lines and planes in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and the spherical triangle. The solution of numerous original exercises including loci problems. Applications to the measurement of surfaces and solids. — $\frac{1}{2}$ unit.

5. Plane Trigonometry.—The subject matter of plane trigonometry as presented in good text-books, including the solution of trigonometric equations of a simple character, the use of logarithms, and the solution of right and oblique triangles, and practical applications. — $\frac{1}{2}$ unit.

GROUP D. SOCIAL SCIENCE, INCLUDING HISTORY.

This group includes History, Political Economy, Commercial Law.

Although there are excellent text-books in History, adequate preparation cannot be obtained by text-book work only. Some collateral work is necessary, whatever text-book is used, and with certain text-books a large amount is necessary. The details of the preparatory work in History are fully stated in A History Syllabus for Secondary

Schools, by the New England History Teachers' Association. Boston, D. C. Heath & Co., 1904.

1. American History and Civics.—The work in Civics must include at least a study of the Constitution of the United States. Representative text-books are Channing's Students' History, Hart's Essentials of American History, Montgomery's Students' History and Larned's History of the United States. —1 unit.

2. Ancient History (Grecian and Roman).—Representative text-books are Morey's Greek History, Myers' History of Greece, Allen's Roman People, Morey's Roman History, Myers' Rome, West's Ancient World, and Wolfson's Essentials of Ancient History. —1 unit.

3. English History.—Representative text-books are Larned's History of England, Montgomery's English History, and Walker's Essentials of English History. An excellent preparation may be made by the combined use of Trenholme's Outline of English History, Cheyney's Short History of England and Cheyney's Readings in English History. —1 unit.

4. Mediaeval and Modern History.—Representative text-books are Harding's Essentials of Mediaeval and Modern History and Myers' Mediaeval and Modern History. —1 unit.

5. Political Economy.—(1) The study of the text of Bullock or Laughlin, or equivalent, complete.

(2) At least six topics investigated by outside reading by each pupil. —1 unit.

6. Commercial Law.—(1) Study of a standard text.

(2) The study of a total of not less than twenty-six specific cases. —1 unit.

GROUP E. NATURAL SCIENCE.

Accompanying the certificates for each of the sciences the student must present at entrance a note-book containing records and drawings of his or her observations and experiments in the laboratory, which must bear the certificate of the teacher in charge that the work was done personally in the laboratory.

1. **Botany.**—Coulter's Text-Book of Botany, Bergen's Foundations of Botany, or an approved equivalent, occupying five periods per week for one year, of which at least one is devoted to laboratory work. —I unit.

2. **Botany and Zoölogy.**—Bergen's Elements of Botany, or an approved equivalent, occupying five periods per week for a half year, of which at least one is devoted to laboratory work. — $\frac{1}{2}$ unit.

Kellogg's Elementary Zoölogy, Linville and Kelly's Text-book in General Zoölogy. Jordan, Kellogg and Heath's Animals, Needham's Lessons in Zoölogy, Coulton's Zoölogy, or an approved equivalent, occupying five periods per week for a half year, of which at least one is devoted to laboratory work. — $\frac{1}{2}$ unit.

3. **Chemistry.**—Elementary Inorganic Chemistry equivalent to the work covered in Remsen's Briefer Course, Hessler & Smith's Essentials, McPherson & Henderson's Elementary Study or Newell's Descriptive Chemistry, accompanied in each instance with laboratory practice. —I unit.

4. **Geology.**—Leconte's Compend or an approved equivalent. — $\frac{1}{2}$ unit.

5. **Physics.**—The preparation required for entrance in Physics shall be an equivalent of five exercises a week for one year, of which at least two are devoted to laboratory work. —I unit.

ADMISSION BY CERTIFICATES.

Graduates of high schools and academies approved by the college may be admitted by certificates. Principals must certify only such students as have by their preparation justified the belief that they are qualified for admission to college. Approval of a school will be withdrawn whenever it appears that the work of the school does not reach the standard required by the college. The candidate will be examined on all requirements not covered by the certificate.

Divided certificates from two or more schools will be accepted when the preparatory work has been done in more than one institution.

The certificate must be made out on a blank furnished by the college and should be mailed to the dean at the close of the school year. Certificate forms will be furnished upon application to Dean C. H. Pettee.

JUNE AND SEPTEMBER ENTRANCE EXAMINATIONS.

Examinations will be given in June and September in the subjects presented for admission. Candidates will present themselves at the registrar's office at 8 a. m. on the first day of the examinations.

SCHEDULE.

Tuesday, June 23, 1914.

Tuesday, September 8, 1914.

Mediaeval and Modern History.....	8.30-10.30 A. M.
Algebra.....	10.30-12.30 A. M.
English.....	1.30- 3.30 P. M.
Plane Geometry.....	3.30- 5.30 P. M.

Wednesday, June 24, 1914.

Wednesday, September 9, 1914.

English History.....	8.30-10.30 A. M.
Physics.....	10.30-12.30 A. M.
Latin, elementary.....	1.30- 3.30 P. M.
Latin, advanced.....	3.30- 5.30 P. M.

Thursday, June 25, 1914.

Thursday, September 10, 1914.

Chemistry	8.30-10.30 A. M.
American History	10.30-12.30 A. M.
French	1.30- 3.30 P. M.
Solid Geometry	3.30- 5.30 P. M.

Friday, June 26, 1914.

Friday, September 11, 1914.

Ancient History	8.30-10.30 A. M.
Plane Trigonometry	10.30-12.30 A. M.
German	1.30- 3.30 P. M.
Botany	3.30- 5.30 P. M.

Examinations not scheduled will be arranged.

DEGREES.

The degree of Bachelor of Science is conferred in the different divisions of the college upon completion of the following requirements:

Agricultural Division.

The completion of the following semester hours:

In 1914, 150 hours.

In 1915, 150 hours.

In 1916, 145 hours.

In 1917, 140 hours.

The completion of the studies required in one of the following branches:

- (a). Animal Husbandry and Dairying.
- (b). Forestry.
- (c). Horticulture.
- (d). General Agriculture.

Students graduating from the four-year courses in agriculture in 1915 and thereafter must present to the dean on or before the second Tuesday preceding commencement satisfactory evidence of having had practical experience in farm work, either through having lived on a farm for at least two years subsequent to the age of 12 or through having worked on a farm for at least six months subsequent to the age of 16.

Students graduating from the Forestry Course must have spent at least three months in practical forest work, which time will be counted as a part of the six months' requirement.

Arts and Science Division.

- (a). General Arts and Science.

1. The completion of 132 semester hours, of which a

minimum of 18 shall be required each semester of the freshman year and a minimum of 16 hours each semester thereafter.

2. The completion of English 51 and 52.

3. The completion of major and minor requirements as follows:

The Arts and Science courses are divided into three groups:

Group I.—Languages and Literature: English, French, German, Latin, Spanish.

Group II.—Mathematics and Sciences: Mathematics, Zoölogy, Botany, Geology, Meteorology, Chemistry, Home Economics, Agriculture,* Drawing, Physics.

Group III.—History, Social Science, and Psychology: History, Political Science, Economics, Sociology, Psychology.

All Arts and Science students shall elect one of these groups as a major in which 24 semester hours must be completed. A grade of 70 must be received in all subjects offered as a fulfilment of the major group requirement. The other two groups shall be minors, in each of which the student is required to complete 18 hours of work.

The selection of the major shall be made at the beginning of the junior year and submitted for approval to the secretary of the Arts and Science Committee at the time of registration.

(b). Home Economics.

The completion of 132 semester hours.

The completion of the courses required in the Home Economics branch.

(c). Mechanic Arts for Teachers.

The completion of 144 semester hours.

The completion of the courses required in the Mechanic Arts Course for Teachers.

*Agriculture as a part of minor requirement only.

Engineering Division.

The completion of 144 semester hours.

The studies required in one of the following branches:

- (a). Chemical Engineering,
- (b). Electrical Engineering,
- (c). Mechanical Engineering.

Students not Classified.

Candidates for the degree of Bachelor of Science who fail to satisfy the requirements of the Agricultural, the Arts and Science, or the Engineering Division may be graduated unclassified under the following conditions:

1. The completion of all work common to the four-year courses.
2. The completion of 144 semester hours.
3. The completion of all but ten or less semester hours in some one of the regular four-year courses.
4. Approval by the faculty not earlier than June first preceding the year of graduation.

ADVANCED DEGREES.

Advanced degrees may be conferred upon candidates who have received the degree of B.S. from this college or any institution of like standing upon the fulfilment of the following requirements:

Degree of M.S.—The successful completion of a course of graduate study pursued in residence and approved by the faculty of the college.

The preparation of an original thesis satisfactory to the faculty of the college.

Degree of M.E.—Professional experience of at least four years.

The successful completion of a course of graduate study approved by the Engineering Division Committee.

The preparation of an original thesis satisfactory to the

faculty of the college upon some subject approved by the Engineering Division Committee.

For details concerning the regulations governing the conferring of degrees address Dean C. H. Pettee.

THESES.

The preparation of a thesis upon some subject connected with the work of the division may be required of candidates for a degree by the division committee.

The subject of a thesis, together with a written approval by the head of the department concerned, must be filed with the registrar within one week of the opening of the second semester. The thesis is to be submitted to the head of the department not later than the second Tuesday preceding commencement day.

The thesis is to be typewritten or printed upon standard thesis paper, eight and one-half by eleven inches, medium weight, and must be neatly bound in black cloth and gilt-lettered on the first cover with title, name of author, degree sought and year of graduation. This bound copy is to be filed and left with the college librarian.

SENIOR STANDING AND DEFICIENCIES.

The regular work of the senior class, including the regular final examinations, is completed at 4 p. m. on the Tuesday of the week preceding commencement, and each member of the class may receive a statement of his standing at the office of the registrar at 2 p. m. on the following Thursday.

All deficiencies must be removed by 6 p. m. of the Saturday of the same week.

BUILDINGS AND EQUIPMENT.

BUILDINGS.

The college is housed in ten large buildings scattered over a handsome campus in the outskirts of the village. Of these buildings six are devoted to offices, recitation rooms or laboratories; one is the large armory and gymnasium, one the dormitory for women, one the library, containing the books of the college and the town of Durham, and one the home of the experiment station. Besides these there are the college barn, several smaller barns, an insectary, a poultry laboratory, poultry houses, and a range of green-houses.

The latest addition to the college equipment is the new engineering building, just completed at a cost of \$80,000 from the plans of James H. Ritchie of Boston.

The building is placed across the right of way formerly occupied by the Boston and Maine railroad, facing Main street. This building is the most prominent of the engineering group.

The material is red brick with gray terra-cotta trimmings. The building has a three-story central section flanked by two wings and with a low laboratory for heavy electrical and mechanical machinery in the rear. The main structure measures 136 feet front by 60 feet deep. The interior corridors have brick walls; the floors are carried on steel beams and heavy timbers, closely spaced to give strength and rigidity. The roof is supported on steel and covered with plastic slate.

The construction of this building enables the departments of Drawing, Mechanical Engineering, Electrical Engineering, and Physics to vacate space in Thompson and Conant Halls for the use of other departments which sorely need the room.

Besides the necessary lecture, recitation rooms, storage rooms and laboratories there is in the basement a room reserved for the use of a mechanician, and on the first floor a room for the use of students for study, computing and reading. Two toilet rooms are provided.

On the rear of the building a fire escape leads down from each floor to the roof of the laboratory section, while in the wing devoted to physics there is a winding stair from the immediate neighborhood of the lecture room to a basement room which communicates directly with the outside.

The department of Drawing occupies the entire top story of the middle section, with two main rooms and a blue-printing room. On the second floor it also has recitation and drawing rooms.

The department of Mechanical Engineering shares the second floor with those of Drawing and Physics, occupying there its offices, lecture and recitation rooms and a drawing room. It also occupies a large portion of the low basement laboratory section in the rear, which is to be fitted with machinery for the study of the properties of steam and water in their technical applications.

The department of Electrical Engineering has offices, lecture, recitation and drawing rooms on the first floor, together with a spacious suite of storage and experimental rooms in the basement, and in the rear laboratory section a laboratory for dynamo electric machinery.

The department of Physics occupies the whole of the west wing of the building. On the second floor is a lecture room, seating about one hundred, and a room for the storage of apparatus; on the first floor a large elementary laboratory, together with a suite of storage, office and recitation rooms in the middle section; in the basement are an intermediate laboratory, small rooms for special work, and others for storage battery and switchboard purposes.

The building is ventilated by the unit system, whereby air is drawn from the outside and blown through heating coils into the rooms directly and discharged through grill

panes in the doors without long and tortuous flues and pipes. The ventilation of each room is directly under the control of the person in charge of the room. The lighting is by incandescent lamps controlled by switches conveniently placed for economical control, with all wiring concealed. The heating is by steam supplied from the central heating plant. All roof conductors are inside the building.

For experimental purposes a system of wiring entirely distinct from the lighting system is used. On one circuit all the connections for the projection lanterns in the various lecture rooms are placed, so that these may be at any time conveniently used with direct current; other wires for conveying power are run from the panels of a central distributing switchboard in the main laboratory of the department of Electrical Engineering to smaller distributing boards in other portions of the building, so that either direct or alternating current of various voltages and frequencies may be delivered practically anywhere in the building.

Thompson Hall is the main administration building and from its eminence commands a view of the entire campus. It contains besides recitation rooms and the large assembly hall where chapel exercises are held, the offices of the president and the dean, and the headquarters of the departments of Modern Languages, Mathematics, Zoölogy, Economic Entomology, and Home Economics.

Conant Hall, formerly the main science building, is now devoted exclusively to the department of Chemistry. This building contains many laboratories and the most complete equipment for teaching chemistry in the state.

Morrill Hall is the headquarters of the Agricultural department of the college and also has the office of the director of the experiment station and the experiment station library. In this building are the laboratories and lecture rooms of the departments of Agronomy, Animal Husbandry, Horticulture, Poultry Husbandry, and Forestry. The building also contains a collection of farm implements, a dark room and a cattle judging room.

Nesmith Hall is occupied by the departments of Chemistry and Botany of the experiment station and contains the laboratory and lecture room of the department of Botany of the college.

The Mechanical Engineering building contains a wood shop, a machine shop, a forge shop, a foundry and laboratories of the Mechanical Engineering department.

In the Armory are the lecture rooms and offices of the Military department, the rooms of the College Club and a large drill hall or gymnasium.

The Dairy building is arranged and equipped in the most up-to-date and sanitary manner. It contains a commercial creamery, with separator room, churning room and cold storage room; laboratories for giving instruction in milk testing, milk inspection, farm butter and cheese making and bacteriology; a reading and exhibition room; a class room and offices.

Smith Hall, the woman's dormitory, was made possible by the generosity of Mrs. Shirley Onderdonk, of Durham, who gave \$16,000 as a memorial to her mother, Mrs. Alice Hamilton Smith. The remainder of the cost, \$10,000, was provided by the state. The building furnishes accommodations for thirty-two students.

In accordance with an act of consolidation between the libraries of Durham and the college, the books of the Durham public library and the college are all shelved in one building and form the Hamilton Smith public library. This consolidation makes an especially good collection, the scientific books of the college supplementing well the more popular books of the town library. The consolidated libraries number about 32,000 bound volumes and 12,000 pamphlets. The departments of Psychology and Sociology, of History and Political Science and of Economics are located in the library building.

Aside the from main library, each department has its working library of the more technical books and those which are of special use in the laboratories and work-shops.

EQUIPMENT.

Agronomy.—For the teaching of farm equipment and machinery, this department is provided with drainage levels for laying out drains, plane tables for making farm maps and a dynamometer and several other pieces of apparatus for studying draft problems. For farm crops work it has a very complete collection of dried specimens of the different forage crops, and the more important varieties of corn, wheat and oats. Seed testing apparatus, grass charts and other illustrative material form a part of the equipment.

A new combined lantern and reflectoscope with a moving picture attachment, together with a large number of lantern slides, has recently been installed in the lecture room.

The soil physics laboratory is equipped with soil bins, a new compacting machine, chemical and torsion balances and various kinds of physical apparatus for the study of soils, including that for the determination of specific gravity and for the making of mechanical analyses.

The agricultural museum contains many of the latest models of the different makes of farm machinery, tools and appliances, including plows, cultivators, harrows, mowers, rakes, corn and grain binders, threshers, manure spreaders, gasolene engines, different kinds of cattle ties and various makes of patent wire fences.

The college farm, with its 380 acres of land, has a variety of soils and soil conditions suited to the growth of nearly all the important farm crops, and thus offers excellent opportunities for practical work and demonstration in the department of agronomy.

Animal Husbandry.—For the various courses in animal husbandry an extensive use is made of the live stock of the college farm. The dairy herd consists of representative animals of the following breeds: Ayrshires, Guernseys, Jerseys and Holsteins. The college owns seven horses repre-

senting the draft type, and in order to become acquainted with the carriage and roadster types, the students are taken to various stock farms where these types may be inspected and judged. For the study of the different breeds of sheep, the experiment station flocks of pure-bred Southdowns, Shropshires, and Rambouillet are used.

A special appropriation by the last legislature has made possible a poultry department. A poultry plant is being built and a competent poultryman has been secured to take charge of the work. At present the plant consists of a number of colony houses, a large farm poultry house and a laboratory building containing an incubator cellar, killing and dressing room and work room. The following breeds of birds are represented here: Barred Plymouth Rocks, Rhode Island Reds, White Leghorns and Light Brahmas. Students are given practical instruction in judging the various breeds, management of flocks, handling of incubators and construction of poultry houses.

In the agricultural building a large room is fitted up for the judging of live stock; instruments for precise measurements are provided, and score cards with a scale of points for each kind of animal are used.

The classroom is provided with a stereopticon lantern and a large collection of lantern slides is used to show the leading individuals of the different breeds of live stock. The herd books of the most prominent breeds are used for the purpose of familiarizing the student with methods of tracing pedigrees and the practices of breeders' associations.

Botany.—The department of Botany has the usual laboratory equipment to meet the needs of the courses in general botany, plant physiology and bacteriology. In the advanced courses, owing to the connection of the department with the experiment station, students will find both the laboratory and greenhouse equipment ample for critical studies on plant diseases and plant nutrition.

Chemistry.—The several chemical laboratories are fairly well equipped. Each is supplied with most of the forms of apparatus required for its particular work. Besides all necessary glass and porcelain ware, this includes water baths, drying ovens, combustion, muffle and assay furnaces, platinum dishes and crucibles, polariscope, spectrôscope, balances, lantern and other lecture appliances.

Dairying.—The Dairy department, with its new dairy building, offers excellent opportunities for instruction in technical and practical dairy work. The college creamery is well equipped with up-to-date machinery, each machine being run by a separate electric motor.

In addition to the product of the college herd, milk and cream are received from over forty farms in Durham and vicinity. By this arrangement sufficient material is furnished for practical work. The farm dairy is equipped with the leading makes of hand separator and hand and small power churns suitable for private dairies. The milk testing and milk inspection laboratory is equipped with Babcock testers, sediment testers, acidimeters and other apparatus necessary for inspection of milk and cream for fat and other qualities.

Drawing.—For free-hand model drawing and for mathematical drawing there is a good supply of geometric models; and for free-hand industrial drawing the nucleus of a good collection exists, consisting of plaster casts of historic ornament, details of human form and antique sculpture, as well as vases and common objects. There is an excellent collection of working models and machines for machine drawing, and various machines in other departments are available for this work.

Electrical Engineering.—The laboratory for electrical engineering occupies the ground floor of the south end of the new engineering building. It has a total area of about 4,500 square feet. There is one room 104 by 36 feet for

dynamo electric machinery. In this main dynamo room there is a large new distributing switchboard, on which are mounted instruments, switches, circuit breakers, ground detectors, synchronizers and plugging devices so arranged that it is possible to connect the various rooms and convey thereto direct current and single, two-phase and three-phase alternating current of different voltages and frequencies.

In addition to this main dynamo room there is a room used for photometry, one for storage battery and one for high potential experiments. The laboratory also includes an instrument room, a mechanician's room and a dark room.

The general equipment of the laboratory includes various dynamos and motors for both direct and alternating currents, several transformers, the necessary measuring instruments and storage batteries, adapted to the needs of students taking this course.

In addition to the regular laboratory equipment, there is available for testing purposes a fully equipped sub-station having a capacity of 75,000 watts supplied by the Rockingham County Light and Power Company, of Portsmouth, N. H. A part of this equipment consists of an automatic induction feeder regulator, including contact making voltmeter and reversing switch.

Farm Department.—An institution like New Hampshire College is not complete without a well-equipped, well-organized and properly managed farm. The farm serves as a laboratory for much of the agricultural instruction, where approved farm methods in practice may be seen and where the students may gain experience by actually performing the work with their own hands.

New Hampshire College farm comprises about 380 acres, of which about 70 are in fine timber, and about 120 are tillage land. Of this land 17 acres are in use by the Horticultural department for gardens and orchards, 8 are used for experimental work in the Agronomy department, and 8 for sheep investigations in the Animal Husbandry depart-

ment. A farm comprising 40 acres of tillage land and 160 of pasture is rented by the Farm department.

The farm buildings consist of a large storage barn, two 125-ton silos, a well-appointed, sanitary dairy stable ell, which will accommodate 38 head of cows, and a large basement under the main barn for housing young stock and dry cows. A new horse barn, 36 by 67 feet, with basement and hay storage loft has been erected and is now occupied by the Farm and Horticultural departments.

Forestry.—The demand for instruction in forestry at the state college has been increasing from year to year and the legislature of 1911 provided for a separate department of Forestry. It is now possible to educate and, in a measure, train agricultural students in scientific forestry. The course is intended to provide not only a special training in forestry, but a broad general training in other lines of agriculture closely related to it. For those who desire to make forestry their life work, every encouragement and assistance will be given.

Durham is well situated with reference to the study of woodlot forestry. All types of native second-growth forests are found near by, and the college owns a tract of sixty acres of old-growth timber where exceptional opportunities are given for the study of mature forests. There are other areas where practice will be given in establishing plantations of forest trees by various methods. A nursery for the growing of seedling forest trees has been started.

All the necessary instruments for making forest maps and measurements, together with collections of wood specimens, lantern slides and photographs, are available in connection with this work.

Home Economics.—The home economics room is furnished with laboratory desks, storage cupboards and apparatus for cooking. The desks are built in cabinet form to hold the necessary utensils and materials for each student. The tops are of Alberene stone. This provides a sanitary

working table and at the same time prevents accidents from fire. Each table is fitted with both gas and electric stoves and ovens.

The cooking utensils are of the materials best suited to the use of each, enameled steel, alumium, glass and porcelain being used. Standard measuring cups and spoons, spring and balanced scales are provided for work in general cookery. For the advanced classes in nutrition and dietetics Harvard trip scales, Dr. Hart's food scales, standard double-scale thermometers, lactometers and graduated glass cylinders are used.

The sinks are of enameled steel and of the most sanitary models.

A storage cabinet, provided with bins for supplies and cupboard space for large utensils, is covered with a nickeloid top and serves for group work and for setting up apparatus of the labor-saving type.

One side of the room is furnished with three small, portable tables and one larger one. These tables each contain a drawer for storing paper, charts and reference material. They serve the purpose of writing tables during the lecture hour and for calculations, to which much time must be given in dietetics, and also afford space for the proper display of dietaries when prepared for critical study by the class. The size of the small tables, four by two and a half feet, makes it possible to arrange them for the several purposes needed in the study of foods from either the qualitative or quantitative point of view. The three tables side by side provide a large table for the serving of regular meals to a group of six or eight; two tables end to end permit the grouping of several days' dietaries for individuals for comparative study; one table alone can be used for setting out a family dietary or for weighing and comparing 100-calorie portions of foods and special dietaries for pathological cases. Enough linen, silver, glass and china are provided for serving simple meals to class groups or invited guests.

The sewing equipment consists of sewing machines, cab-

inets, yard sticks, chairs and tables. Ample blackboard space, charts and materials for drafting patterns aid the student in the constructive work in line and form.

Horticulture.—The lecture room is fitted up with a stereopticon lantern and the collection of lantern slides is being continually enlarged. The pomological and vegetable gardening laboratories are of original design and offer every facility for modern work. A great many varieties of vegetables are grown in the experiment station trial ground, and these offer exceptional opportunities for identification and study in the laboratory for some time after field conditions have gone by. The orchards, gardens and grounds also offer opportunities for demonstrating the theories advocated in the lecture room. Propagation of fruits, shrubs and flowering plants is practised. A fine collection of Vilmorin charts is owned by the department.

Mechanical Engineering.—The mechanical laboratory equipment includes a 40-horsepower steam engine; a steam boiler especially equipped for testing; a large duplex pump; nozzles for measurements during hydraulic tests; a 10-inch standpipe, a 6,000-gallon measuring tank and other apparatus for an extensive series of hydraulic experiments; a 50,000-pound Olsen machine with the necessary tools and measuring instruments for tension, compression and transverse tests; a 12-horsepower gas engine; a Westinghouse air-brake pump with locomotive and tender attachments; steam and gas engine indicators; a surface condenser; a Bristol pyrometer; a cement testing machine with the necessary sieves and other apparatus for testing according to the recommendations of the committee for cement testing; and the usual supply of scales, gauges, thermometers and small apparatus.

Physics.—Besides the necessary furniture the department is supplied with the usual small tools, calipers, scales, balances, weights, hydrometers, calorimeters, thermometers, etc., and with other apparatus for the performance in the

laboratory of experiments in mechanics, sound, light, magnetism and electricity.

The lecture room has a small but growing collection of apparatus for the illustration, both experimentally and with the projection lantern, of the laws of matter and energy in their various relations, and of the history of physics.

Instruction is carried on by means of lectures, with mimeographed outlines furnished to students and constantly kept up to the development of the courses; recitations and discussions based on standard text-books, and experimental work in the laboratory. Mimeographed outlines are furnished for the laboratory experiments, with concise directions and references, and reports are written by the students on the results of their experiments, for examination and criticism by the teacher.

The Physics department occupies all of the west wing of the new engineering building. In the basement there are a large laboratory room for intermediate work in courses yet to be developed, two small rooms for individual work, a switchboard room, a room for storage battery and for chemical work, and a storage room. On the first floor are the general elementary laboratory, partly divided off into small rooms for work in light or for balances, a room for apparatus storage, the office and a recitation room. On the second floor are the lecture room and a room for the storage of lecture apparatus. The lecture room will seat about one hundred.

Shopwork.—The wood shop is one of the best equipped pattern shops in the country. It is supplied with benches and the necessary tools to accommodate twenty students at one time. Other equipment consists of a universal pattern maker's saw, board-planer, buzz-planer, band saw, speed-lathes and a large pattern maker's lathe with molding and boring attachments.

The equipment of the machine shop consists of engine lathes, a speed-lathe, a vertical drill, a Flather planer, a large universal milling machine, a plain milling machine, a

shaper, a power hack saw, a tool grinder, twelve benches with vises; and a large number of small tools, including micrometer, calipers and gauges necessary for accurate work.

In the forge shop are seventeen Sturtevant down-draft forges with anvils and necessary tools. The blast to the forges is furnished by a No. 4 blower, and the smoke carried away by a 60-inch exhauster. These are driven by a small steam-engine.

All the shops are operated by 550-volt three-phase induction motors, suitably connected to line shafting and driving the tools by the "group plan."

Surveying.—The surveying instruments include the usual equipment of the land surveyor: the level, transit, compass, sextant, Saegmülle attachment (solar compass), and plane-table.

Zoölogy.—Few other institutions are so favorably situated geographically for the study of zoölogy as is New Hampshire College. Within a few minutes walk of the laboratory is the Oyster river where it meets the tide water from Great Bay. This furnishes a gradation of salt, brackish and fresh water with an abundance of their characteristic fauna. Great Bay, the Piscataqua river and the open ocean are within easy access, and have their own peculiar, characteristic forms. On the other hand there are numerous bodies of fresh water, with typical fresh water forms.

The department of Zoölogy is prepared to offer courses along the following lines: (A) Systematic Zoölogy; (B) Physiology and Sanitation; (C) Philosophical Zoölogy; (D) Anatomical Zoölogy.

The equipment for the work in systematic zoölogy consists of a well-lighted laboratory, provided with tables, charts, dissecting and compound microscopes. All of the latest books and periodicals on systematic zoölogy are at the students disposal. The lecture room is fitted with a new reflectoscope capable of projecting opaque objects, text-book figures or lantern slides. The room has a seating capacity

of eighty, and is provided with armed chairs which enables the students to readily take down notes and drawing. There is a fairly complete collection of local invertebrates, and a very good collection of the birds of New Hampshire. The work in systematic entomology is greatly aided by a large and complete collection of insects which is the property of the experiment station.

The proximity to both salt and fresh water renders the work in advanced systematic zoölogy unusually attractive. In addition to the regular collecting equipment, nets, aquaria, etc., advanced students also have the use of row-boats and a gasoline launch.

In the work in physiology, hygiene and sanitation the department is provided with an unusually fine collection of injected preparations of the human body, and with numerous charts. The same laboratory and equipment is used in this work as noted above.

For work in evolution and experimental zoölogy the department has a very complete library. Studies in ecology in Great Bay and vicinity are encouraged, for which purpose the students have the use of a camera equipment. In addition to the study of evolution under natural conditions the department also furnishes aquaria for laboratory study and experiments.

The work in anatomical zoölogy is greatly facilitated by an abundance of fresh material which may be collected as needed. For the study of human and comparative anatomy a full set of skeletons and preserved material is provided. Students interested in histology have access to a private collection of some two thousand microscope slides.

Museum.—The museum had for a nucleus the collection made during the state geological survey. To this additions have been made from various sources. Specimens are being collected to illustrate the zoölogy of New Hampshire, and New Hampshire collectors and naturalists are invited to make the museum the permanent depository of their collections.

FOUR-YEAR COURSES.

AGRICULTURAL DIVISION.

The courses of this division are designed for the general education and scientific training of students in the various economic branches of agriculture. The lecture and recitation work of the classroom is supplemented largely by practical exercises in the laboratories. Seminary courses are also given, especially for seniors and advanced students. The whole curriculum is so arranged that about one third of the studies may be termed cultural, one third, scientific, and one third, technical. During junior and senior years the student has elective options in certain courses of study which enable him to specialize in animal husbandry and dairying, horticulture, forestry or general agriculture.

While the two-year course is intended to give the student as thorough training in the science and practical details of farm operations as the time will allow, it does not give the opportunity for a broad general foundation of pure and applied science that the four-year courses afford; the latter courses aim primarily to combine a college education with that of a technical vocation. Many of the graduates of the four-year courses return to the farm for the purpose of putting into practice the knowledge and training of their college work, and many of them are becoming successful and prosperous citizens of the community; others who have no farms of their own accept salaried positions as superintendents or foremen on the dairy, fruit or truck farms of large owners; still others take positions as teachers of science and agriculture in our secondary and high schools or as assistants in our agricultural colleges and experiment stations.

The Agricultural Division offers the following four-year courses of study:

Animal Husbandry and Dairy Course.—This course is designed for those students who wish to specialize either in animal husbandry or dairying. Election of courses of instruction between these two departments may be made throughout the junior and senior years. The dairy building with its new and complete equipment, together with the additional courses and increased facilities for instruction in the Animal Husbandry department, make this course especially attractive.

Forestry Course.—The demand for a special and separate course in forestry has been increasing from year to year, and in view of the extent and importance of the forests and forestry operations within the state, the establishment of such a course seems well justified. The legislature of 1911 very generously provided funds for the creation of a Forestry department at the college which, for the present, will be housed on the second floor of Morrill Hall. This course is intended to provide not only a special training in forestry, but a broad general training in other lines of agriculture closely related to it. The college forest of sixty acres of old-growth pine and hemlock furnishes a splendid laboratory and ample opportunity for studying forestry questions.

Horticultural Course.—This is the course for those students who contemplate making a specialty of some line of horticultural work. Several advanced courses in botany will be required, while during the senior year opportunity will be given to elect courses in other departments. The Horticultural department is well equipped with gardens, orchards, greenhouses and laboratories for the study of the different phases of this industry, especially fruit growing, which is so prominent in the agriculture of the state.

General or Teaching Course in Agriculture.—This course is intended for those students who desire to secure a general training in the science of agriculture without specializing along some particular line. Provision is made during

both the junior and senior years for the student to elect one or more courses of instruction in whatever department he wishes.

The rapidly increasing demand for teachers in agriculture in our secondary schools has indicated the necessity of training men especially for this important line of work. In addition to the sciences and strictly agricultural work courses in pedagogy, educational psychology and rural sociology are taken during the junior and senior years.

ARTS AND SCIENCE DIVISION.

In the Arts and Science Division the following courses are offered:

General Arts and Science Course.—This course provides a general college training which especially prepares for secondary school teaching, business or graduate study. By means of the group system of elective studies an opportunity is given the student to specialize in zoölogy, botany, chemistry, physics, drawing, agriculture, mathematics, modern languages, English, psychology, sociology, political science, economics, history, and home economics.

Home Economics Course.—The course in home economics furnishes instruction in the branches that especially serve the need of women students. The work is planned to meet the demands of the day for scientific training in home making, to fit students to enter fields of professional activity in institutional and educational lines of work, and to provide thorough but somewhat less technical training for those students who wish to elect home economics as either a major or a minor subject in the Arts and Science Course.

The technical work in household science is based upon the principles of physical, biologic and social sciences. The courses in foods, nutrition and dietetics require chemistry and physiology; those in sanitation and home nursing necessitate a knowledge of chemistry and bacteriology; home

administration and the care and education of children, a knowledge of the principles of economics, psychology and sociology; and an understanding of the energy value of foods and their mechanical equivalents in work necessitates a knowledge of physics. These subjects are taken in the different departments of the college. The training in drawing and color and design which is gained in the department of Drawing finds a worthy expression in the courses in costume design, household art and home decoration.

In the arrangement of studies electives have been provided for in each year. The student is permitted to elect three semester hours of work in the freshman year, six in the sophomore year and semester hours amounting to nearly half of the total requirements for junior and senior years. This large amount of elective work affords ample opportunity for the study of modern languages, history, mathematics, social and political sciences or courses of interest to women in the other departments of the college. Provision is made for research work in the senior year for students who are prepared for it.

Mechanic Arts Course for Teachers.—This course provides an opportunity for preparation for the teaching of manual courses in secondary schools and institutions. It originated to meet the increasing demand for graduates of the college qualified to teach manual and mechanic arts courses. Although much of the work of this course is necessarily prescribed in such subjects as drawing, mathematics, shop work, English and psychology, a reasonable opportunity is given the student to elect other subjects in the Arts and Science Division. At the present time the demand for graduates from this course for secondary teaching is greater than the college can satisfy.

ENGINEERING DIVISION.

Chemical Engineering Course.—This course is intended to fit for the career of professional chemist or chemical engineer, and to give a good foundation for original and independent chemical research.

Instruction is imparted by lectures, recitations and a large amount of carefully supervised laboratory work. The laboratory course is largely an individual one and the work of each student is conducted with reference, not only to the particular object he may have in view, but also to the acquirement of a broad knowledge of chemical science. The student is given a thorough training in German and French to enable him to read with ease the chemical literature; a thorough grounding in mathematics, necessary for advanced theoretical chemistry or chemical engineering; a somewhat limited amount of special engineering work, both mechanical and electrical; and a thorough undergraduate training in theoretical and applied chemistry. He is encouraged to develop the power of solving chemical problems by independent thought through the aid of the reference works and chemical periodicals which the library contains. Owing to the fact that the laboratories are becoming crowded the number of students taking this course is limited to six in each class. These six are chosen at the close of the freshman year from those who have applied. Fitness to become successful chemists will alone determine the choice made.

Electrical Engineering Course.—The Electrical Engineering Course is intended to meet the demands of a young man fitting himself for practical and professional engineering in connection with the various applications of electricity.

By means of lectures, recitations and laboratory work, the subjects of the course are brought to the attention of the student in such a manner as not only to emphasize the present needs of the practitioner and engineer, but to give him the groundwork that will enable him to grasp and under-

stand the constantly increasing number of problems that require solution.

The instruction aims to impart a complete practical and theoretical knowledge of the best modern types of electrical machines and appliances and the methods of designing, building and operating them.

The rapid progress in recent years in applying electricity to commercial uses renders it difficult, if not impossible, for one without a technical education to gain prominence in the work and be intrusted with its more responsible positions.

Mechanical Engineering Course.—The Mechanical Engineering Course is intended to train young men for positions of responsibility in the field of the mechanical industries. The studies in the course are scientific, including mathematics, physics and chemistry; technical, including drawing, shop work, thermodynamics, hydraulics, machine design, electrical engineering, power engineering, and cultural studies, calculated to enable the technical man to take his proper place in the world of men.

Instruction is given by means of text-book work and laboratory work whenever possible. When necessary this work is supplemented by illustrated lectures and assigned reading. Throughout the course the theoretical work is supplemented by actual practice in mechanical operation and scientific research, by training in the use of tools for working wood and metals, and by experimental tests and demonstrations in the mechanical, chemical and physical laboratories.

POST-GRADUATE AND SPECIAL COURSES.

The college offers opportunity for post-graduate study in agriculture, biology and chemistry, and on the completion of satisfactory work advanced degrees will be given. Persons of mature years presenting satisfactory evidence of their ability to complete any desired course of study may be admitted as special students by vote of the faculty.

FRESHMAN REQUIREMENTS FOR THE VARIOUS FOUR-YEAR COURSES.

FRESHMAN SUBJECTS.		COURSES.
Required.	Elective.	
Chemistry Drawing English { French or German Mathematics Drill Military Science Shop Work Zoölogy	None	Agricultural Division 1. Animal Husbandry and Dairy Course 2. Forestry Course 3. Horticultural Course 4. General Agricultural and Agricultural Teaching Course
English Drill Military Science *Physical Culture	Chemistry Drawing English French German History Latin Mathematics Zoölogy Economics	Arts and Science Division 1. Arts and Science Course
Chemistry English Home Economics Physical Culture Zoölogy Drawing	French German History Mathematics	2. Home Economics Course
Chemistry Drawing English Mathematics Drill Military Science Shop Work	None	3. Mechanic Arts Course for Teachers
Chemistry Drawing English Mathematics Drill Military Science Shop Work Electrical Engineering Mechanical Engineering	None	Engineering Division 1. Electrical Engineering Course 2. Mechanical Engineering Course
Chemistry Drawing English Mathematics Drill Military Science Shop Work { French or German	None	3. Chemical Engineering Course

* Physical Culture for women takes the place of Drill and Military Science for men.

DESCRIPTION OF STUDIES.

AGRONOMY.

PROF. TAYLOR, ASST. PROF. STOKES.

51. Farm Equipment and Machinery.

Lectures and recitations upon the equipment of farms; fencing; drainage; tillage and harvesting machinery; concrete construction; silos; farm motors; roads and principles of draft. Practical work in map making, laying out drains, rope splicing, comparing farm machines, etc. For Agricultural Sophomores. *Three exercises per week. 1st S.*

52. Soils.

Text-book and recitations upon the formation, kinds and physical properties of soils; the movements and conservation of soil moisture; the relation of heat and air to soil; the nature and physical effects of tillage and fertilizers; laboratory work and experimentation with soils to show the physical effects of different conditions and texture. For Agricultural Juniors. *Three exercises per week. 2d S.*

53. Farm Crops.

Text-book and recitations upon the history, use, value and methods of culture of our various farm crops, including hay and grass, with particular reference to New England conditions. Laboratory practice in judging the different varieties of grains and grasses. For Agricultural Juniors except in Forestry Course.

Three exercises per week. 1st S.

54. Fertilizers.

Lectures, text-book and recitations upon the principles of fertility and plant nutrition. A study of the value and use of plant food materials, including farm manures. For Agricultural Seniors except in Forestry Course.

Prerequisites—Chemistry 51 and 52. Three exercises per week. 2d S.

55. Farm Management.

Text-book, lectures and recitations upon different types of farming, size of farms, cropping systems, marketing farm products, choice of a farm, and farm records and accounts. Practical work in laying out, planning, scoring, and making inventories of farms. For Agricultural Seniors except in Forestry Course.

Prerequisite—Agronomy 51.

Three exercises per week. 1st S.

56. Special Agronomy.

Advanced work for students interested in some particular line. No class exercises. The hours and kind of work must be arranged with the department before the course is elected. For Agricultural Seniors.

Prerequisite—All preceding courses in Agronomy except 54.

Three exercises per week. 2d S.

57. Agricultural Seminar.

Library and reference work, the preparation of bibliographies, a study of the work and history of agricultural colleges and experiment stations. Lectures upon the history of agriculture. Elective for Agricultural Seniors.

Two exercises per week. 1st S.

ANIMAL HUSBANDRY.

PROF. ECKMAN, ASST. PROF. MITCHELL, MR. JONES.

51. Types and Breeds of Live Stock.

A study of the different breeds of horses, cattle, sheep, and swine in respect to their origin, history, development, characteristics, and adaptability to different conditions of climate and soil. One afternoon each week is devoted to judging the different breeds. For Agricultural Sophomores.

Four exercises per week. 1st S.

52. Advanced Stock Judging.

The work of this course consists of judging and measurement, and special problems concerning the various breeds. Students intending to compete for the Live Stock Judging Team should elect this course. Elective for Agricultural Sophomores. Open to students only by permission of the head of the department.

Prerequisite—Animal Husbandry 51. Two exercises per week. 2d S.

54. Feeds and Feeding.

Lectures and recitations upon the laws of nutrition; composition and digestibility of feed stuffs; influence of feed on the animal body; a study of leading cereals and by-products; feeding standards. Practice will be given in computing and compounding rations for various purposes. For Agricultural Juniors, except students in Forestry.

Prerequisites—Chemistry 51 and 52. Three exercises per week. 2d S.

55. Veterinary Anatomy.

Lectures and recitations upon the anatomy and physiology of the domesticated animals. Special attention is paid to the study of the horse and cow. Skeletons, various anatomical specimens, models, charts and lantern slides are used to make the subject as practical as possible. This course is designed to give a foundation for the study of animal diseases, surgery, etc. For Animal Husbandry Juniors. Elective for others.

Three exercises per week. 1st S.

56. Veterinary Medicine.

Lectures and recitations upon the principal diseases and ailments of farm animals, medicines, and methods of administering; minor surgery. For Animal Husbandry Juniors. Elective for others.

Prerequisite—Animal Husbandry 55.

Three exercises per week. 2d S.

57. Breeding and Management.

A course consisting of lectures and recitations upon the principles and practices of animal breeding, and the general care and management of live stock. For Seniors in Animal Husbandry and Dairy Course.

Prerequisites—Animal Husbandry 51 and 54.

Three exercises per week. 1st S.

59. Sheep Raising.

Lectures and recitations upon the breeds of sheep; adaptability to this section; care and management; fitting for the shows, and feeding for market purposes; the raising of hot-house lambs; also practical exercises in judging the various breeds. Elective for Agricultural Seniors.

Three exercises per week. 1st S.

61. Poultry.

This course covers the subjects of poultry house construction, types and breeds of poultry, feeding, killing and dressing, caponizing, and equipment. Elective for Agricultural Juniors.

Three exercises per week. 1st S.

62. Poultry.

This course covers the subjects of incubation, brooding, care of young stock, market poultry, poultry diseases, and poultry farm problems.

Prerequisite—Animal Husbandry 61.

Three exercises per week. 2d S.

63. Advanced Veterinary Medicine.

A course of lectures upon obstetrics, surgery, and pharmacy. Elective for Agricultural Seniors.

Prerequisites—Animal Husbandry 55 and 56.

Three exercises per week. 1st S.

BOTANY.

PROF. BUTLER, ASST. PROF. BLACK, MISS TEMPLETON.

51. General Botany.

Morphology and histology of plants. Lectures and laboratory work. For Agricultural Sophomores. Elective for other students. Given in two sections. *Three exercises per week. 1st S.*

52. General Botany.

Organography and classification of plants. Lectures and laboratory work. For Agricultural Sophomores. Elective for other students. Given in two sections.

Prerequisite—Botany 51. Three exercises per week. 2d S.

53. Plant Physiology.

Structure and properties of the cell, absorption and movement of water; metabolism; growth and irritability. Lectures and laboratory work. For Forestry, Horticultural and General Agricultural Juniors. Elective for other students.

Prerequisite—Botany 52. Three exercises per week. 1st S.

54. Plant Histology.

Technique. Characterization and differentiation of plant tissues. Comparative histology. Occasional lectures; laboratory work. For Forestry Juniors. Elective for other students.

Prerequisite—Botany 52. Three exercises per week. 2d S.

55. General Bacteriology.

Lectures on the morphology and physiology of the bacteria, the principal bacterial diseases, the rôle of bacteria in the arts and industries. Lectures. For Home Economics Juniors. Elective for other Juniors and Seniors. *Three exercises per week. 1st S.*

56. Bacteriology.

Technique. Morphology and biology of the principal non-pathogenic and pathogenic bacteria. Laboratory work.

Prerequisite—Botany 55 except for Animal Husbandry and Dairy students. Three exercises per week. 2d S.

57. Plant Pathology.

Diseases of plants, their symptoms, causes and prevention. Lectures and laboratory work. For Forestry and Horticultural Seniors. Elective for other students.

Prerequisite—Botany 53. Three exercises per week. 1st S.

58. Mycology.

Morphology and biology of the fungi. For advanced students. Occasional lectures, laboratory work.

Prerequisite—Botany 57.

Two exercises per week. 2d S.

59. Embryology.

Technique. Origin and development of the embryo. For advanced students. Occasional lectures; laboratory work.

Prerequisite—Botany 53.

Two exercises per week. 1st S.

60. Advanced Botany.

For advanced students. Prerequisites will depend on the nature of the subject selected for study.

Credit and hours by arrangement. 2d S.

61. Advanced Botany.

For advanced students. Prerequisites will depend on the nature of the subject selected for study.

Credit and hours by arrangement. 1st S.

CHEMISTRY.

PROF. JAMES, ASST. PROF. PERLEY, MR. KATZ, MR. HOLDEN.

51. Inorganic Chemistry.

Lectures and recitations on general and theoretical chemistry, illustrated by experiments, charts, specimens, lantern views, etc. Solution of chemical problems will be required. For Agricultural and Engineering Freshmen. Elective for other Freshmen.

Three exercises per week. 1st S.

52. Inorganic Chemistry.

A continuation of Course 51, but the time will be mainly spent on the metallic elements, their metallurgy, salts, etc.

Prerequisite—Chemistry 51.

Three exercises per week. 2d S.

54. Qualitative Analysis.

Laboratory practice, with occasional lectures and recitations. The student is expected to become proficient in the separation and detection of the common acids and bases and to keep a full set of notes. For Engineering Freshmen.

Prerequisite—Chemistry 51.

Three exercises per week. 2d S.

55. Inorganic Chemistry.

Similar to Chemistry 51. For Home Economics Freshmen.

Three exercises per week. 1st S.

56. Special Chemistry.

A continuation of Course 55 and differing slightly from Course 52.
Prerequisite—Chemistry 55. Three exercises per week. 2d S.

57. Special Organic Chemistry.

A study of the more important organic compounds from the viewpoint of the Home Economics student. For Home Economics Sophomores.

Prerequisites—Chemistry 55 and 56. Three exercises per week. 1st S.

59. Introductory Qualitative Analysis.

A brief introductory course in qualitative analysis specially arranged for Agricultural students. For Agricultural and Mechanic Arts Sophomores. Elective for Arts and Science students.

Prerequisite—Chemistry 51. Two exercises per week. 1st S.

60. Quantitative Analysis.

Introduction to quantitative analysis, consisting of the analyses of simple compounds and materials such as feeds, fertilizers, soils, water, etc. For Agricultural Sophomores.

Prerequisites—Chemistry 51 and 52. Three exercises per week. 2d S.

61. Qualitative Analysis.

A short advanced course for Chemical Sophomores on insoluble substances and the rarer elements, to precede Chemistry 65.

Twenty exercises. 1st S.

63. Inorganic Preparations.

A brief course upon the preparation and purification of inorganic compounds, including their extraction from minerals. For Chemical Sophomores.

Prerequisites—Chemistry 51 and 52. Twelve exercises. 1st S.

65. Quantitative Analysis.

A preliminary course in quantitative analysis to familiarize the student with the general methods of chemical manipulation and analysis. For Chemical Sophomores. Elective for Arts and Science Sophomores, Juniors and Seniors, provided laboratory facilities permit.

Prerequisite—Chemistry 54. Four exercises per week. 1st S

66. Quantitative Analysis.

A continuation of Chemistry 65. For Chemical Sophomores.

Five exercises per week. 2d S.

68. Organic Chemistry.

Lectures and recitations. A study of the chemistry of the carbon compounds. For Chemical Sophomores. Elective for Arts and Science students.

Prerequisites—Chemistry 51 and 52. Three exercises per week. 2d S.

69. Organic Chemistry.

A continuation of Course 68. For Chemical Juniors. Elective for Arts and Science students.

Prerequisite—Chemistry 68. Two exercises per week. 1st S.

71. Organic Chemical Laboratory.

The course consists mainly of laboratory practice in preparing and purifying organic compounds. Lectures and recitations will be held from time to time in connection with the practice. For Chemical Juniors. Elective for Arts and Science students.

Prerequisite—Chemistry 68. Three exercises per week. 1st S.

73. Advanced Quantitative Analysis.

This course will be made to fit the end which each student has in view and will be largely an individual one. For those students desiring to specialize in agricultural and food chemistry the analysis made will tend in the main toward agricultural products, fertilizers, mucks, marls, manures, dairy products, waters, foodstuffs, sugars, etc. For the student wishing to enter metallurgical works, the analyses will be in the main upon iron and steel and other metals, ores, limestones, slags, alloys, fuels, etc. As a preparation for the study of medicine, work will be done on poisons, drugs, foods, urine, etc. Other lines will be arranged to meet the wants of the individual student. Each student will be given some practice in all of the branches of agricultural, metallurgical, medical, sanitary and industrial chemistry, in order to lay a foundation for any future work which may be required of him. A short course in gas and oil analysis will also be provided. For Chemical Juniors.

Prerequisite—Chemistry 65. Four exercises per week. 1st S.

74. Advanced Quantitative Analysis.

A continuation of Chemistry 73. For Chemical Juniors.

Five exercises per week. 2d S.

75. Physical Chemistry, Lectures.

Advanced study of chemical theory. Practical experiments will be performed with the aid of the student, in the determination of vapor density, molecular weights, specific heat, etc.; and the study of isomorphism, diffusion of gases, solutions, ionization, electrolysis, molecular and atomic volume, thermo chemistry, equilibrium, the phase rule,

etc. will take up much of the time. For Chemical Juniors or Seniors. Elective for Arts and Science students.

Prerequisites—Chemistry 51 and 52. Three exercises per week. 1st S.

76. Physical and Electro Chemistry, Lectures.

A continuation of Course 75. For Chemical Juniors or Seniors. Elective for Arts and Science students. *Three exercises per week. 2d S.*

77. Advanced Inorganic Chemistry.

Advanced study of the elements and their compounds. For Chemical Juniors and Seniors. Elective for Arts and Science students.

Prerequisites—Chemistry 51 and 52. Three exercises per week. 1st S.

78. Industrial Chemistry.

Lectures on chemical manufactures, such as sugar, sodium carbonate, fertilizers, sulphuric acid, glass, matches, paints, dyes, soaps, illuminating gas, petroleum, etc. The lectures will be illustrated by lantern views, and trips to the leading New England cities to examine important chemical manufactures will be taken as far as practicable. For Chemical Juniors or Seniors.

Prerequisites—Chemistry 51 and 52. Two exercises per week. 2d S.

79. Assaying.

A course in the fire assay of gold and silver ores. For Chemical Seniors.

Prerequisite—Chemistry 65.

Seventeen exercises. 1st S.

80. Metallurgy.

Lectures describing the processes employed in the smelting of ores, of iron, lead, copper, zinc, silver, gold, etc., and the methods used in refining these metals. The lectures are illustrated by stereopticon and by specimens of metallurgical products. For Chemical Juniors or Seniors.

Prerequisites—Chemistry 51 and 52. One exercise per week. 2d S.

Chemistry 78 and 80 are given in alternate years with Chemistry 76.

83. Advanced Quantitative Laboratory.

Especially arranged for students of the Chemical Engineering Course. May merge at any time into 84 and will usually do so about the middle of the first semester. For Chemical Seniors.

Six exercises per week. 1st S.

84. Thesis. (Chemical Research.)

The work of the last semester of the Chemical Engineering Course is given up to the special study of some selected subject in any branch of chemical science and the student is required to present a thesis showing him to be capable of independence of thought and manipulation. For Chemical Seniors.

Six exercises per week. 2d S.

DAIRYING.

PROF. RASMUSSEN, MR. WILSON.

51. Domestic Dairying.

Nutritive and economic value of milk; milk hygiene, and the relation of milk to public health; market milk, modified milk, condensed milk, milk powders, fermented milks; butter, cheese and ice cream. Demonstrations are given in manufacture and in testing purity of dairy products. Two lectures and one laboratory period. Elective for Home Economics and Arts and Science Juniors and Seniors.

Three exercises per week. 1st S.

52. Farm Dairying.

Dairying in its relation to other branches of agriculture and other industries; study of the composition of milk; the use of the Babcock test, and tests for determining acidity of milk; the use of the lactometer in detecting adulteration of milk; value and methods of keeping records of dairy cows; coöperation in dairying.

Three exercises per week. 2d S.

53. Butter Making.

A study of the secretion, and of the chemical and physical properties of milk; different systems of creaming, and factors influencing efficiency of hand separators; pasteurization, cream ripening, commercial starters, churning and machinery. Required for Animal Husbandry and Dairy Juniors. Elective for other Agricultural students.

Prerequisite—Dairy 52.

Three exercises per week. 1st S.

54. Market Milk.

A study of the value of milk as a food; the production and handling of market milk, of certified and modified milk, and commercial milk inspection. Exercises will be given in the judging of milk and cream and scoring of dairy barns. For Animal Husbandry and Dairy and General or Teaching Juniors. Elective for all other students.

Prerequisite—Dairy 52.

Three exercises per week. 2d S.

55. Factory Management.

Lectures and recitations on the organization, location, construction and operation of factories; special problems connected with the manufacture of butter; dairy conditions in foreign countries; scoring of butter. Elective.

Prerequisites—Dairying 52 and 53. Three exercises per week. 1st S.

57. Dairy Bacteriology.

Methods of bacteriological analysis of milk and its products; isolation and study of the different types of dairy bacteria; study of effect of

separation, clarification, pasteurization, aëration, and straining on bacteria in milk. Elective for Animal Husbandry and Dairy Seniors.

Prerequisite—*Botany 56.*

Three exercises per week. 1st S.

58. Cheese Making.

Lectures and laboratory work covering the details of manufacture, curing and marketing of the more important kinds of cheese.

Prerequisite—*Dairy 52.*

Three exercises per week. 2d S.

60. Ice Cream Making.

A study of the making, handling, and marketing of lacto, ices, and ice cream. Elective.

Prerequisite—*Dairying 51 or 52.*

Two exercises per week. 2d S.

62. Judging Dairy Products.

Practice in judging milk, cream, butter, cheese and ice cream. One lecture and one laboratory. Elective.

Prerequisites—*Dairying 52, 53, 54 and 58.*

Two exercises per week. 2d S.

64. Dairy Research.

A study of the work of the experiment stations and other dairy literature. Elective.

Prerequisite—*6 credit hours in Dairying.*

Two exercises per week. 2d S.

DRAWING.*

PROF. PUTNAM, MR. LATON.

These courses are of an industrial nature and include both free-hand and mathematical branches of the subject.

51. Engineering Drawing. Prof. Putnam, Mr. Laton.

Free-hand lettering; free-hand drawing; use of instruments; mathematical drawing; inking; systems of object drawing; orthographic projection; isometric drawing. For Engineering and Mechanic Arts Freshmen. Elective for Arts and Science Freshmen.

Two exercises per week. 1st S.

53. Shop Mathematics. Prof. Putnam.

The application of mathematical principles to the solution of shop problems. For Electrical and Mechanical Engineering Freshmen.

Two exercises per week, first half of semester. 1st S.

*Students are advised not to purchase drawing instruments or supplies before consultation with the drawing instructor.

54. Industrial Drawing and Elementary Farm Building Construction.
Prof. Putnam.

A brief study in the use of drafting instruments, together with the drawing of plans of simple farm buildings, including the study of the necessary bill of materials and approximate cost of construction. For Agricultural Freshmen. *Two exercises per week. 2d S.*

55. Color Problems.

A study of color theories, harmonies, qualities, and nature color. For Home Economics Sophomores. *One exercise per week. 1st S.*

56. Descriptive Geometry. Prof. Putnam, Mr. Laton.

Recitations and drawing exercises in the solution of geometrical problems by orthographic projection, including practical problems on bridge beams, rafters, piping, etc. For Electrical and Mechanical Engineering Freshmen.

Prerequisites—Drawing 51 and Mathematics 53.

Three exercises per week. 2d S.

57. Machine Drawing. Mr. Laton.

Working drawings, including the making of tracings, blue prints, and Van Dyke prints of various machines and machine tools. For Electrical and Mechanical Sophomores. *Three exercises per week. 1st S.*

58. Descriptive Geometry. Prof. Putnam.

Special drawing arranged to meet the needs of students in the Mechanic Arts Course. For Mechanic Arts Freshmen.

Four exercises per week, first half of semester. 2d S.

59. Design of Farm Buildings. Prof. Putnam.

This course is a continuation of Drawing 54 and consists of drawings of floor plans and framing details of farm buildings. Elective for Agricultural Juniors.

Two exercises per week. 1st S.

60. Mechanical Drawing.

Free-hand lettering; free-hand drawing; use of instruments, and drawing of house plans. For Home Economics Freshmen.

Two exercises per week. 2d S.

61. Special Drawing. Prof. Putnam.

A continuation of Drawing 58, including the study of Descriptive Geometry. For Mechanic Arts Sophomores.

One exercise per week. 1st S.

62. Special Drawing. Prof. Putnam.

A continuation of Drawing 61, including the study of machine details. For Mechanic Arts Sophomores.

Two exercises per week. 2d S.

64. Free-hand or Charcoal Drawing. Prof. Putnam.

Elective for Arts and Science Freshmen.

*Two exercises per week. 2d S.***65. Special Drawing.** Prof. Putnam.A continuation of Drawings 62, including the study of cam design.
For Mechanic Arts Juniors.*One exercise per week. 1st S.***66. Special Drawing.** Prof. Putnam.A continuation of Drawing 65, including the study of gear design.
For Mechanic Arts Juniors.*Two exercises per week. 2d S.***71. Special Drawing.** Prof. Putnam.A continuation of Drawing 66, including a systematic study of the
correlation of Shop and Drawing Courses. For Mechanic Arts Seniors.*One exercise per week. 1st S.***72. Special Drawing.** Prof. Putnam.A continuation of Drawing 71, including a systematic study of shop
mathematics as used in the drafting room. For Mechanic Arts Seniors.*Two exercises per week. 2d S.***ECONOMICS.**

PROF. SMITH.

1. Elementary Economics.A survey of the general field of economics, including such fundamen-
tals as value, price, consumption, production, exchange, rent, wages,
interest, profits, money, and international trade.Two sections: one for Agricultural and Engineering Seniors; the
other for Arts and Science and Mechanic Arts Sophomores.*Three exercises per week. 1st S.***2. Commercial Geography.**A study of the commodities of commerce; the factors which influence
their production; the regions of their productions; markets and ex-
change facilities. For Arts and Science Freshmen and Sophomores.*Three exercises per week. 2d S.***4. Money and Banking.**A study of the principles of money; credit; bimetallism; the national
banking systems of the United States and foreign countries; trust com-
panies. Elective for Arts and Science Juniors and Seniors and Agri-
cultural Seniors.Economics 4 and 6 are given in alternate years. Economics 4 will
be given in 1914-1915.*Prerequisite—Economics 1.**Three exercises per week. 2d S.*

5. Labor Problems.

A study of such subjects as labor organizations; strikes and lockouts; the open and closed shop; labor legislation. Elective for Arts and Science Juniors and Seniors and Agricultural Seniors.

Economics 5 and 7 are given in alternate years. Economics 5 will be offered in 1914-1915.

Prerequisite—Economics 1.

Three exercises per week. 1st S.

6. Public Finance and Taxation.

A study of public revenues and expenditures with special attention to problems of taxation. Elective for Arts and Science Juniors and Seniors and Agricultural Seniors.

Economics 4 and 6 are given in alternate years. Economics 6 will be given in 1913-1914.

Prerequisite—Economics 1.

Three exercises per week. 2d S.

7. Socialism.

A study of historical types of socialism; the economic theories of Karl Marx; the causes which lie back of the present socialist movement; together with its aims and propaganda. Elective for Arts and Science Juniors and Seniors and Agricultural Seniors. Economics 5 and 7 are given in alternate years. Economics 7 will be offered in 1913-1914.

Prerequisite—Economics 1.

Three exercises per week. 1st S.

8. Agricultural Economics.

A consideration of the three factors of production, land, labor and capital, as related to agriculture. Among other rural problems studied will be shifts in population, the income of the farmer, markets, speculation, and co-operation. Required of Agricultural Seniors. Elective for Arts and Science Juniors and Seniors.

Prerequisite—Economics 1.

Three exercises per week. 2d S.

9. Corporation Finance.

A study of the methods used to finance corporations; the various types of stocks and bonds; underwriting; government regulation of corporations. Elective for Arts and Science Juniors and Seniors and Agricultural Seniors.

Prerequisite—Economics 1.

Three exercises per week. 1st S.

11. Economic Problems of the Home.

Among the subjects studied will be the following: the effect of modern industry upon industry of the home; economic and legal position of woman in the family and in society; laws regulating food supplies; marketing problems. For Junior and Senior women.

Two exercises per week. 1st S.

ELECTRICAL ENGINEERING.

PROF. HEWITT, ASST. PROF. HITCHCOCK.

1. **Dynamo Electric Machinery.** Prof. Hewitt.

This course includes a general study of the various electrical quantities such as electromotive force, current, resistance, permeability of iron; the use of standard measuring instruments; direct and alternating current dynamos and motors including elementary theory. A large number of practical problems illustrate the applications of the above. One exercise per week is devoted to laboratory experiments illustrating the practical application of theory. For Electrical and Mechanical Juniors.

Prerequisites—Physics 52 and Mathematics 56.

Four exercises per week. 1st S.

2. **Dynamo Electric Machinery.** Prof. Hitchcock.

A continuation of Course 1. A study of electrical measuring instruments, cells, batteries, electrolysis, electroplating, electrotyping, the elements of photometry and electric illumination, inductance, capacity, and elementary alternating currents. One exercise per week is devoted to laboratory experiments illustrating the practical application of theory. For Electrical and Mechanical Juniors.

Prerequisite—Electrical Engineering 1.

Four exercises per week. 2d S.

3. **Telegraph and Telephone.** Prof. Hitchcock.

A study of the acoustic and electrical principles of telephony, transmitting and receiving apparatus, magneto and common-battery switchboards and accessories, selective party-line systems, intercommunicating systems, overhead and underground construction, phantom, simplex, and composite circuits, transpositions, etc. The principles of telegraphy, sounders, repeaters, etc. Wireless telegraphy and telephony. Automatic devices, electric signaling for purposes of alarms, railroads, etc. For Electrical Seniors. *One exercise per week. 1st S.*

6. **Application of Electricity to Agriculture.** Prof. Hewitt.

Arranged for and adapted to students taking agriculture. The course consists of a general study of the electric dynamo and motor, method of connecting same to the supply circuit and the care and operation of each; a general study of simple problems in transmission, methods of wiring for electric power and lighting; the telephone including the general principles upon which it operates and different systems of installation; electric bell wiring and signaling apparatus; simple water power developments and equipments; electrical utensils for domestic use, etc. This course consists of two lectures and one laboratory period per week.

Open only to Seniors in Agriculture. Three exercises per week. 2d S.

7. History of Electrical Engineering. Prof. Hewitt.

A series of lectures giving a brief history of electrical engineering and outlining some of the advantages of this profession. This series of lectures has been planned in order to help a student in the choice of his course after his Freshman year. For Electrical and Mechanical Freshmen.

One exercise per week. 1st S.

9. Industrial Electricity. Prof. Hewitt, Prof. Hitchcock.

Arranged for and adapted to students taking the Mechanic Arts Course. Open only to Seniors in the Mechanic Arts Course.

Three exercises per week. 1st S.

11. Electrical Engineering Practice. Prof. Hitchcock.

A study of the properties of periodic curves, the effects of inductance and capacity, the use of complex quantities, and a more detailed study of generators, motors, transformers, converters, and other electrical apparatus. For Electrical Seniors.

Prerequisite—Electrical Engineering 2.

Four exercises per week. 1st S.

12. Electrical Engineering Practice. Prof. Hewitt.

A continuation and completion of Course 11. Hydro-electric developments including the design of reinforced concrete dams and power houses and the general subject of water-power engineering; high tension power transmission; design of transmission lines and distributing systems; selection of apparatus for generating stations and distributing systems; lightning protection. For Electrical Seniors.

Prerequisite—Electrical Engineering 11.

Four exercises per week. 2d S.

14. Electric Railways. Prof. Hitchcock.

The practicability of construction from an economic standpoint; determination of the size, type, and seating capacity of cars; track location; train schedules; methods of control; train resistance; speed-time and current-time curves; selection of motors; the feeder system; electrolysis; power station and substation location; storage batteries; electric track switches; etc. Illustrated by problems. For Electrical Seniors.

Two exercises per week. 2d S.

15. Electrical Laboratory. Prof. Hewitt, Prof. Hitchcock.

An advanced series of experiments. A written report will be required for which one additional credit hour will be given. For Electrical Seniors.

Three exercises per week. 1st S.

16. Electrical Laboratory. Prof. Hewitt, Prof. Hitchcock.

A continuation of Course 15, with experiments of a more advanced nature. A written report will be required for which one additional credit hour will be given. For Electrical Seniors.

Three exercises per week. 2d S.

18. Thesis. Prof. Hewitt, Prof. Hitchcock.

A deposit of fifteen dollars to cover any damage done to instruments, apparatus, etc., is required in this course. Any unexpended balance is refunded at the close of the college year. Where apparatus is constructed as a part of a thesis, it shall remain the property of the department. Optional with head of department. For Electrical Seniors.

Three exercises per week. 2d S.

19. Dynamo Electric Machinery. Prof. Hitchcock.

A continuation of Course 2, but arranged to meet the requirements of students in Mechanical Engineering. This course is not so advanced as Course 11, but covers the same subjects in a more elementary manner. For Mechanical Seniors.

Prerequisite—Electrical Engineering 2.

Three exercises per week. 1st S.

21. Industrial Electricity. Prof. Hewitt.

A careful study of the principles and methods employed in electrical measurements; resistance of wire and batteries; current measurement by ammeters and electrolysis; the use of electrical measuring instruments; a series of laboratory experiments specially arranged to meet the requirements of chemical engineers. A brief study will be made of the dynamo, motor, transformer, primary and secondary batteries, arc and incandescent lamps and the general principles of electrical distribution. Experiments in electrolysis, electrical furnaces, reduction of metals, etc., are provided. For Chemical Seniors.

Three exercises per week. 1st S.

22. Industrial Electricity. Prof. Hewitt.

A continuation of Course 21, but more advanced in nature. For Chemical Seniors.

Prerequisite—Electrical Engineering 21.

Three exercises per week. 2d S.

24. Design of Electrical Machinery. Prof. Hitchcock.

A study of the design of the more important electrical machines, including the calculation of the dimensions of the machine, both electrical

and mechanical, and the predetermination of its performance from the dimensions. For Electrical Seniors.

Prerequisite—Electrical Engineering 11.

Two exercises per week. 2d S.

26. Illuminating Engineering. Prof. Hitchcock.

A theoretical discussion of the principles of illumination and the application of these principles to concrete examples. For Electrical Seniors who do not take Electrical Engineering 18. Elective for other Electrical Seniors.

Two exercises per week. 2d S.

28. Contracts and Specifications. Prof. Hewitt.

The laws and forms of engineering contracts; standard specifications for materials of construction and apparatus. For Mechanical and Electrical Seniors.

Two exercises per week. 2d S.

ENGLISH.

PROF. RICHARDS, PROF. SCOTT, MISS HODGKINS. MR. SCUDDER.

51. English Composition and Rhetoric. Mr. Scudder.

The purpose of this course is to assist the student in learning how to express his ideas in clear, correct English. Material for daily and weekly themes is taken from the actual college life of the individual student, from current events of public interest, and from the student's outside reading. Eight exercises are devoted to library practice under the direction of the college librarian. For all Freshmen.

Three exercises per week. 1st S.

52. English Composition and Rhetoric. Mr. Scudder.

A continuation of English 51.

Prerequisite—English 51.

Three exercises per week. 2d S.

53. Advanced Composition and Literary Criticism. Prof. Richards.

This is a course in practical English composition, in which the various forms of writing, such as newspaper reporting, book reviewing, business letters, the essay and the short story, are studied.

To supplement these exercises the student is required to read and criticise intelligently the writings of at least one noted prose writer and one poet, embodying the results of such study in a carefully prepared essay at the close of the semester. For Mechanic Arts Sophomores. Elective for Arts and Science Sophomores and Juniors.

Prerequisites—English 51 and 52.

Three exercises per week. 1st S

54. Introduction to English Literature. Prof. Richards.

This course is designed to give a general survey of English literature from the ninth to the nineteenth century. To one who intends to teach

English it is of fundamental importance. Lectures, recitations and outside reading constitute the work of the semester. Elective for Freshmen, Sophomores and Juniors. *Three exercises per week. 2d S.*

***55. The English Novel.** Prof. Richards.

The historical development of the English novel and the chief characteristics of modern fiction are studied in this course. Lectures, extensive outside reading and occasional dramatic representations of scenes from various novels constitute the work of the semester. Elective for Arts and Science and Mechanic Arts Juniors and Seniors.

Prerequisites—English 51 and 52. Three exercises per week. 1st S.

56. Argumentation and Debating. Prof. Richards.

This course offers training in the fundamental principles of oral debate and written argumentation, it acquaints the student with the laws of parliamentary procedure, and it introduces him to the rules and customs of state and national legislatures. An essential part of the course—in some respects the most valuable feature—is the practice in formal and extemporary debate, such debates being held at least once a week throughout the semester. For Agricultural and Electrical Seniors. Elective for other students. *Three exercises per week. 2d S.*

***57. Modern English Poetry.** Prof. Richards.

In this course a study is made of the great poems of English literature written between 1790 and 1890. While special attention is given to the poetry of Wordsworth, Tennyson and Browning, considerable outside reading is required in the works of Shelley, Keats, Rossetti, Arnold and other poets of the nineteenth century. Elective for Arts and Science and Mechanic Arts Juniors and Seniors.

Prerequisites—English 51 and 52. Three exercises per week. 1st S.

58. The English Drama, 1585–1625. Prof. Richards.

Certain plays of Marlowe, Shakespeare, Jonson, Webster, Beaumont and Fletcher will be read and discussed in class. Elective for Arts and Science Juniors and Seniors.

Prerequisites—English 51 and 52. Three exercises per week. 2d S.

60. American Literature. Prof. Scott.

This course consists of lectures and extensive outside reading. For Mechanic Arts Seniors. Elective for Arts and Science and Agricultural Seniors. *Four exercises per week. 2d S.*

*English 55 and 57 are given in alternate years. English 57 is given in 1914–1915.

***62. Shakespeare's Plays.** Prof. Richards.

A study of all of Shakespeare's plays. Recitations and occasional dramatic representations of famous scenes. A large amount of reading required. Elective for Arts and Science Juniors and Seniors.

Prerequisites—English 51 and 52. Three exercises per week. 2d S.

63. Writing for Publication. Mr. Scudder.

A practical course in the preparation of articles for the newspapers and magazines. The student is taught to select the essential and present it tellingly. It is offered for all those whose vocation will demand frequent writing for publication, and as a preparation in part for those who intend to take up newspaper work after graduation. This is not a course covering the entire field of journalism, but the student will be instructed in the duties of a reporter and be given constant practice in writing news stories. Elective for Sophomores and Juniors who have no conditions in the English of Freshman year.

Three exercises per week. 1st S.

64. A Continuation of English 63. *Three exercises per week. 2d S.***ENTOMOLOGY.**

PROF. O'KANE, MR. HADLEY.

1. Principles of Economic Entomology.

The relation of the structure and classifications of insects to methods of insect control. The preparation and application of insecticides. Spray machinery and appliances. For Agricultural Juniors. Elective for Arts and Science Sophomores, Juniors and Seniors.

Three exercises per week. 1st S.

2. Applied Economic Entomology.

The application of methods of insect control to typical injurious species. Studies in the life histories and habits of important insect pests of orchard, garden and field crops. Elective for Agricultural Juniors and for Arts and Science Sophomores, Juniors and Seniors.

Prerequisite—Entomology 1. Three exercises per week. 2d S.

3. Insects of Domestic Animals.

The insect enemies of domestic live stock; their life histories, habits and means of control. Adapted especially for students in Animal Husbandry. Elective for Agricultural Seniors and for Arts and Science Juniors and Seniors.

Prerequisite—Entomology 1. Two exercises per week. 1st S.

* English 58 and 62 are given in alternate years. English 62 is offered in 1914-1915.

4. Household Insects. Medical Entomology.

The life histories, habits and means of control of insects of the household and of stored products. The relation of insects to disease. Adapted especially for students in Home Economics. Elective for Arts and Science Sophomores, Juniors and Seniors, and for Agricultural Juniors and Seniors. *Two exercises per week. 2d S.*

5. Advanced Economic Entomology.

Detailed studies of problems involved in applied entomology. The literature of economic entomology. Investigational methods. Practice in arranging projects. Original investigations in the life history and habits of one or more injurious species. Adapted for advanced students. Elective for Agricultural Seniors and for Arts and Science Juniors and Seniors. Credit hours by arrangement. *1st S.*

6. Advanced Economic Entomology.

Continuation of Course 5.

Prerequisites—Entomology 1, 2 and 5.

Two to four exercises per week. 2d S.

FORESTRY.

PROF. FOSTER.

51. Principles of Forestry.

This course is intended to give the student a general knowledge of forestry; relation of forests to soil, moisture, light and climatic conditions; the important systems of treating woodlands practised in Europe and the United States; the habits of important economic timber trees and the character and uses of these woods; the preparation of forest maps and working plans, including rough estimates of standing timber and the rate of growth of different stands; the artificial regeneration of forests by seeding and planting; forest fires; the forest regions of the United States; the practice of forestry by the government and states. For all Agricultural Juniors except those in the Forestry Course. Elective for other students, except those taking Forestry 55. *Three exercises per week. 1st S.*

52. Silviculture.

The establishment of forests through artificial regeneration; value of different species; seed collecting; testing and storage; nursery work; direct seeding; planting; care of plantations; cost of establishing plantations; planting plans. Supplemented by actual nursery and planting work. For Forestry Juniors. Elective for other students. *Three exercises per week. 2d S.*

53. Dendrology.

A study of the habits, distribution and characteristics of the native trees and important introduced trees of the Northeastern States, in both summer and winter conditions, and with particular reference to the prominent and constant features which lead to ready identification; and a general study of the important timber trees of the United States, including the structure of their woods. For Forestry and Mechanic Arts Juniors. Elective for other students.

Four exercises per week. 1st S.

54. Forest Mensuration.

Methods of determining the contents and growth of individual trees and of whole forests by different units; use of log rules and the measurement of logs and felled trees; the measurement of standing trees; methods of timber estimating; study of growth in diameter; height, and volume; construction and use of volume and yield tables. This course calls for the use of forest instruments and actual practice in measuring trees and whole stands. For Forestry Juniors. Elective for other students.

Three exercises per week. 2d S.

55. Silviculture.

A study of the life history of trees; the relation of the different species to light, moisture, soil, temperature and to each other in the forest; reproduction of trees, form and character of stands; the origin and determination of forest types; forest maps; relation of forests to stream-flow; forest descriptions; the improvement of the forest through use and proper treatment; the various systems of cutting and reproducing forests by natural means as practised in Europe and the United States, supplemented by frequent woods practice and demonstrations. For Forestry Juniors. Elective for other students, except those taking Forestry 51.

Five exercises per week. 1st S.

56. Forest Management.

The economic principles underlying the management of forests; the calculation of present and future values of forest property based on productive power; financial considerations of forest management; taxation of forest land; preparation of working plans in Europe, India, and the United States. Includes collateral reading, writing on forestry subjects and discussions. For Forestry Seniors.

Prerequisites—Forestry 52, 53, 54, 55, 57, and 59.

Four exercises per week. 2d S.

57. Forest Protection.

Consideration of practical measures for the protection of forests from fire, insects, fungous diseases, grazing, trespass, and destructive

lumbering; and an examination of the federal and state laws relating to forest interests. For Forestry Seniors.

Prerequisites—Forestry 52, 53, 54, and 55.

Two exercises per week. 1st S.

58. Advanced Forestry.

Elective for Forestry Seniors.

Prerequisites—Forestry 52, 53, 54, 55, 57, and 59.

Three exercises per week. 2d S.

59. Practice of Forestry.

Development and present status of forestry in different countries; the work of the federal government and its management of the national forests; state forest policies; the lumber industry in the United States; the application of forestry to different regions. For Forestry Seniors.

Prerequisites—Forestry 52, 53, 54, and 55.

Three exercises per week. 1st S.

60. Forest Utilization.

Advanced elective course for Mechanic Arts Juniors or Seniors. Work to be arranged to meet the needs of individual students.

Prerequisite—Forestry 53.

Three exercises per week. 2d S.

61. Advanced Forestry.

Work to be arranged according to the needs of individual students. Elective for Forestry Seniors.

Prerequisites—Forestry 52, 53, 54, and 55.

Three exercises per week. 1st S.

FRENCH.

PROF. WHORISKEY, ASST. PROF. WHITMAN, MISS PETTEE.

1. Elementary French, Miss Pettee.

Elements of French Grammar. Reading of simple stories; conversation and dictation. Elective for Arts and Science students.

Three exercises per week. 1st S.

2. A continuation of French 1.

Elective for Arts and Science students.

Three exercises per week. 2d S.

3. French Prose. Prof. Whitman.

Reading and translation; composition. Elective for Arts and Science Sophomores. Freshmen who have offered French for admission are allowed to take French 3 and 4.

Prerequisite—French 2.

Three exercises per week. 1st S.

4. A continuation of French 3.

*Prerequisite—French 3.**Three exercises per week. 2d S.*

*5. French Literature of the Nineteenth Century. Prof. Whitman.

Selections from Hugo, Balzac, Sand, Dumas père, Daudet, Gautier.
Composition. Elective for Arts and Science students.

*Prerequisite—French 4.**Three exercises per week. 1st S.*

*6. A continuation of French 5.

Elective for Arts and Science students.

*Prerequisite—French 5.**Three exercises per week. 2d S.*

*7. French Literature of the Seventeenth Century. Prof. Whitman.

Corneille; Racine; Molière; Bossuet; Boileau; Mme. de Sévigné;
La Fontaine. Composition. Elective for Arts and Science students.

*Prerequisite—French 4.**Three exercises per week. 1st S.*

*8. A continuation of French 7.

Elective for Arts and Science students.

*Prerequisite—French 7.**Three exercises per week. 2d S.*

GEOLOGY.

PROF. JACKSON, PROF. JAMES.

51. Elementary Geology.

The elements of geology. Special attention is given to local geology and excursions are made to various points of interest in the vicinity. For Agricultural Juniors. Elective for Mechanic Arts Juniors and Arts and Science Juniors and Seniors.

Three exercises per week. 1st S.

52. Historical Geology.

The development of the continents of the earth and the evolution and distribution of the animal and plant forms from the earliest times to the present. Recitations, lectures and laboratory work. Elective for Agricultural and Arts and Science Seniors.

*Prerequisites—Zoölogy 51 and Geology 51.**Three exercises per week. 2d S.*

54. Mineralogy.

A short course in blowpipe analysis, followed by laboratory practice in the determination and study of minerals, with special reference to their economic value. For Chemical Juniors. Elective for Agricultural and Arts and Science Juniors.

Prerequisites—Chemistry 51 and 52. Two exercises per week. 2d S.

* French 5 and 6 are to be given in 1914-1915 and in alternate years with French 7 and 8.

GERMAN.

PROF. WHORISKEY, ASST. PROF. WHITMAN.

1. Elementary German. Prof. Whoriskey, Prof. Whitman.

Elements of German Grammar. Reading of simple stories; conversation; singing of German folk-songs. For Agricultural and Chemical Engineering Freshmen who have not offered German for admission. Elective for others. *Three exercises per week. 1st S.*

2. Elementary German.

A continuation of German 1. For Agricultural and Chemical Engineering Freshmen who have not offered German for admission. Elective for others. *Three exercises per week. 2d S.*

3. German Prose. Prof. Whoriskey.

Reading and translation. For Chemical Engineering Sophomores. Elective for others. Freshmen who have offered German for admission are allowed to take German 3 and 4. *Three exercises per week. 1st S.*

4. German Prose.

A continuation of German 3. Scientific German for Chemical Engineering Sophomores. Elective for others.

Prerequisite—German 3. Three exercises per week. 2d S.

***5. Goethe.** Prof. Whoriskey.

His Life and Works. Elective for Arts and Science students.

Prerequisite—German 4. Three exercises per week. 1st S.

***6. Goethe.**

A continuation of German 5. Elective for Arts and Science students.

Prerequisite—German 5. Three exercises per week. 2d S.

***7. Schiller.** Prof. Whoriskey.

His Life and Works. Elective for Arts and Science students.

Prerequisite—German 4. Three exercises per week. 1st S.

***8. Schiller.**

A continuation of German 7: Elective for Arts and Science students.

Prerequisite—German 7. Three exercises per week. 2d S.

†9. German Composition and Conversation. Prof. Whoriskey.

Elective for Arts and Science students.

Three exercises per week. 1st S.

*German 5 and 6 are to be given in 1914–1915. German 7 and 8 are to be given in 1915–1916, and German 13 and 14 are to be given in 1916–1917.

†German 9 and 10 are to be given in 1914–1915 and in alternate years with German 11 and 12.

*10. A continuation of German 9. *Three exercises per week. 2d S.*

*11. German Composition and Conversation. Prof. Whoriskey.

Elective. *Three exercises per week. 1st S.*

*12. A continuation of German 11.

Elective. *Three exercises per week. 2d S.*

†13. Sudermann. Prof. Whoriskey.

His Life and Principal Works. Elective for Arts and Science students.

Prerequisite—German 4. Three exercises per week. 1st S.

†14. Sudermann and His Contemporaries.

A continuation of German 13.

Prerequisite—German 13. Three exercises per week. 2d S.

HISTORY.

PROF. SCOTT, PROF. SMITH.

In the courses in History an important place is given to historical reading carried on in the reference room. In some cases a considerable part of the work is written.

1. History of Europe from 476 to 1492.

Recitations and collateral reading. For Mechanic Arts Juniors.
Elective for Arts and Science Freshmen.

Three exercises per week. 1st S.

2. History of Europe from 1492 to 1715.

Recitations and collateral reading. For Mechanic Arts Juniors.
Elective for Arts and Science Freshmen.

Three exercises per week. 2d S.

3. History of Europe from 1715 to 1815.

Recitations and collateral reading. Elective for Arts and Science Sophomores.

Prerequisites—History 1. Three exercises per week. 1st S.

4. History of Europe since 1815.

Recitations and collateral reading. Elective for Arts and Science Sophomores.

Prerequisite—History 2 or History 3.

Three exercises per week. 2d S.

* German 9 and 10 are to be given in 1914-1915 and in alternate years with German 11 and 12.

† German 5 and 6 are to be given in 1914-1915. German 7 and 8 are to be given in 1915-1916, and German 13 and 14 are to be given in 1916-1917.

5. American History to 1801.

Elective for Arts and Science Juniors.

Three exercises per week. 1st S.

6. Political and Constitutional History of the United States from 1801 to 1860.

Elective for Arts and Science Juniors and Mechanical Arts Juniors and Seniors.

Three exercises per week. 2d S.

7. Political and Constitutional History of the United States since 1860.

Elective for Arts and Science and Mechanic Arts Seniors.

Three exercises per week. 1st S.

HOME ECONOMICS.

PROFESSOR THOMPSON.

1. Personal Hygiene.

A study of the laws of health and the means of preserving and improving the physical development and efficiency of the individual, together with lectures and discussions upon the right living, the control of the physical and mental environment, individual responsibility for race progress, economic and ethical aspects of hygiene. Required of all women Freshmen.

One exercise per week. 1st S.

2. Household Methods and Management.

Lectures and discussions on household equipment for heating, lighting, and ventilating, drainage and plumbing, sanitary and economical methods of work, labor saving devices, domestic laundering, table service, marketing and cost accounting, plans for parties and entertainment of guests, social forms and usages. For Home Economics Freshmen.

Three exercises per week. 2d S.

3. Food Economics.

The study of food products in their marketable and manufactured forms; factors affecting cost of food materials; cost of food preparation and kitchen equipment. In the laboratory accompanying this course emphasis is placed upon neatness and accuracy in work and exact systems of weights and measures are taught. For Home Economics Freshmen.

Three exercises per week. 1st S.

5. Clothing.

The clothing textiles are studied as to their structure, properties, and economic and hygienic values; study of clothing manufacture. Prac-

tice is given in selection, care and repair of clothing, and in garment making. Elective or may be offered for Course 3 by Home Economics Freshmen. *Three exercises per week. 1st S.*

7. Foods.

This course takes up the chemical composition and nutritive value of foods. The foodstuffs are considered in regard to their digestibility, their available nutrients, and the changes effected by the application of heat. Laboratory practice in the chemistry and cookery of foods. For Home Economics Sophomores.

Prerequisite—Chemistry 55. Three exercises per week. 1st S.

8. Foods.

A continuation of Course 7, together with discussions of dietaries and serving of meals. For Home Economics Sophomores.

Prerequisite—Course 7. Four exercises per week. 2d S.

10. Household Art and Design.

A study of the primitive industries; ancient and modern hand craft; art needle work; color and design in house furnishings. For Home Economics Sophomores. *Two exercises per week. 2d S.*

11. Nutrition.

A detailed study of the digestive processes with special attention to the action of enzymes and hormones. The organic foodstuffs are discussed with regard to their chemical structure, the products obtained by their hydrolytic cleavage, and their specific dynamic action in the body. Other topics taken up are: protein metabolism and the protein requirement; the fuel value of food and the energy requirement of the body; influence of food consumption upon metabolism; quantitative relation between work performed and total metabolism; methods of investigation employed in the study of nutrition; comparisons of feeding and fasting experiments; the inorganic foodstuffs and the function of the individual ash constituents of the diet; food habits and dietary standards; food economy. For Home Economics Juniors.

Prerequisites—Chemistry 57, Home Economics 7 and 8, Zoölogy 57. Three exercises per week. 1st S.

12. Dietetics.

Problems in dietary calculations; standard portions of food materials; application of the principles of human nutrition in the adaptation of diet to varying physiological, economic and social conditions; nutritional diseases and abnormalities; food therapy. For Home Economics Juniors.

Prerequisite—Home Economics 11. Three exercises per week. 2d S.

13. Home Decoration.

Wall and floor finishes; selection of home furnishings; space and color values; estimations of costs and comparisons of sanitary and artistic furnishings. For Home Economics Juniors.

Prerequisites—Drawing 51 and Home Economics 10.

Two exercises per week. 1st S.

15. Textiles.

Microscopic and chemical study of fabrics and fibres used in textile manufacture; modern processes of dyeing, spinning and weaving. Elective for Juniors.

Prerequisites—Chemistry 55, 56, and 57, and Home Economics 10.

Three exercises per week. 1st S.

16. Home Nursing.

Care of the sickroom and patient; observation and recording of symptoms; administration of medicines; treatment of injuries and emergencies; hygiene of infectious diseases; use of antiseptics and disinfectants. For Home Economics Juniors.

Prerequisites—Chemistry 55 and 56, and Botany 55.

Two exercises per week. 2d S.

18. History of Costume.

Comparison of primitive and historic costumes with modern dress; study of designs and conventions of national modes. Elective for Juniors.

Two exercises per week. 2d S.

19. Home Administration.

Organization of the household; standards of living; operating expenses; apportionment of income; estimation of budgets; elective expenditures; domestic service; coöperative housekeeping; social responsibilities. For Home Economics Seniors.

Two exercises per week. 1st S.

20. Humanics.

Human phylogenesis; influence of heredity upon natural tendencies and biologic efficiency of the individual; development through infancy, childhood and adolescence; sex education; social hygiene. For Home Economics Seniors.

Prerequisite—Senior standing.

Two exercises per week. 2d S.

21. Seminar.

Research problem in nutrition, food chemistry, experimental cookery, household economics or textiles. Elective for Home Economics Seniors.

Three exercises per week. 1st S.

22. Seminar.

Investigation in problem assigned in Course 21. Elective for Home Economics Seniors.

Three exercises per week. 2d S.

23. Teaching of Domestic Art.

This course considers the arrangement and presentation of domestic art in the elementary and secondary schools; outlines of lessons; development of courses; selection of equipment. Elective for Seniors who have elected textiles and clothing.

Three exercises per week. 1st S.

24. Teaching of Domestic Science.

Course in teaching domestic science similar to Course 23. Elective for Home Economics Seniors.

Three exercises per week. 2d S.

HORTICULTURE.

PROF. GOURLEY, ASST. PROF. WOLFF, MR. LUMSDEN.

52. Olericulture.

Lectures and recitations upon the culture, classification and identification of vegetables. In this general study of market gardening is included the construction and management of hot beds and cold frames, starting early vegetables under glass, planting in the open garden, methods of culture, systems of irrigation, a study of garden implements and the marketing of vegetables. For Agricultural Sophomores.

Two exercises per week. 2d S.

53. Greenhouse Construction and Management.

Lectures, recitations and laboratory work. This course aims to familiarize the student with modern methods of greenhouse work and the more important plants grown under glass. Sorts, varieties, culture, marketing, and enemies of greenhouse plants are studied. Each student is required to do practical work in propagating, potting, watering, and ventilating. A study is made of the history and development of different types of greenhouses, including methods of heating and general management. Required in Horticultural Course, Junior year. Elective in other Agricultural Courses.

Three exercises per week. 1st S.

54. Practical Pomology.

A study of the fundamental problems of fruit growing, such as location, choice of site, kind and adaptability of soil for fruit growing, soil management, planting of orchards, pruning, sprays and spraying, thinning, harvesting and marketing. Lectures and laboratory work. For Agricultural Sophomores.

Three exercises per week. 2d S.

NOTE.—The College has several hundred fruit trees which are available for the students in studying orchard operations. All types of spray machinery from the knapsack to the power sprayer are used in class work.

55. Systematic Pomology and Commercial Orchardling.

The first eight weeks of the semester are devoted to a study of the leading varieties of fruits and their adaptations, with special reference to New England conditions. During the remainder of the semester this course deals with the management of commercial orchards, problems of marketing, packing, transportation and coöperation. Special study is given to the experimental data on maintaining soil fertility in the orchard and on other fundamental factors in orchard management. In the laboratory special instruction is given to the packing of apples for market and judging fruit. Lectures, reference reading and laboratory work. Required in Horticultural Course, Senior year.

Four exercises per week. 1st S.

56. Landscape Gardening.

A study of the principles involved in ornamental and landscape gardening. Special attention is given to the beautifying of home surroundings. Laboratory work consists in landscape design and practice in laying out and planting home and public grounds. Required in Horticultural Course, Junior year. Elective in other Agricultural Courses.

Three exercises per week. 2d S.

57. Evolution and Improvement of Plants.

The applications of the principles of evolution to the improvement of plants. Variation, selection and heredity as applied to the problems of plant breeding in agricultural practice. Required in Horticultural and General Agricultural Courses, Senior year. Elective in other Agricultural Courses.

Prerequisites—Botany 51 and 52. Two exercises per week. 1st S.

58. Nursery Management.

A study of the methods of propagation and the care of trees, shrubs and perennial plants in the nursery. Lectures, reference readings and practice. Required in Horticultural Course, Junior year. Elective in other Agricultural Courses.

Three exercises per week. 2d S.

60. Floriculture.

A special study of the classification, history and development of the flowers and plants grown commercially and about the home, together with instruction and practice in their propagation and culture. Required in Horticultural Course, Junior year. Elective for others.

Prerequisites—Botany 51 and 52. Two exercises per week. 2d S.

61. Commercial Floriculture.

A study of the growing of cut flowers and decorative plants. Lectures and practical exercises in the greenhouse. Elective for Agricultural Seniors.

Prerequisite—Horticulture 60. Three exercises per week. 1st S.

62. Horticultural Seminar.

A review of the important horticultural literature and methods of investigational work. Required in Horticultural Course, Senior year. Elective in other Agricultural Courses.

One exercise per week. 2d S.

64. Vegetable Gardening Under Glass.

A study of the methods of growing market vegetables in greenhouses. Lectures and practical exercises in the greenhouse. Elective for Agricultural Seniors.

Prerequisite—Horticulture 52.

Two credit hours. 2d S.

65. Advanced Horticulture.

Special work in horticulture can be taken by special arrangement with the head of the department. Prerequisites will depend on the work taken. Advanced work in olericulture, including a course in canning vegetables and by-products from the orchard, will be offered. Elective for Agricultural Seniors.

Two to five exercises per week. Time to be arranged. 1st S.

66. Advanced Horticulture.

A continuation of Horticulture 65. Special work in horticulture. Elective for Agricultural Seniors. Time and credit to be arranged.

Two to five exercises per week. 2d S.

LATIN.

PROF. WHORISKEY, ASST. PROF. WHITMAN.

1. Livy (Book I). Prof. Whitman.

Elective for Arts and Science students who have offered Advanced Latin for entrance.

Three exercises per week. 1st S.

2. Horace (Odes and Epodes).

Prerequisite—Latin 1.

Three exercises per week. 2d S.

***3. Terence (Andria and Phormio).**

Elective for Arts and Science students.

Prerequisite—Latin 2.

Three exercises per week. 1st S.

***4. Tacitus (Annals).**

Elective for Arts and Science students.

Prerequisite—Latin 3.

Three exercises per week. 2d S.

*Not to be given in 1914–1915.

MACHINE DESIGN.

PROF. PUTNAM, MR. LATON.

52. Kinematics of Machinery. Prof. Putnam.

The study of machine parts with respect to their forms, motions, modes of connection, and methods of manufacture. For Electrical and Mechanical Sophomores.

Prerequisite—Mathematics 51.

Two exercises per week. 2d S.

53. Kinematics of Machinery. Prof. Putnam.

The application of Machine Design 52 to practical problems worked out in the drafting room. For Electrical and Mechanical Juniors.

Prerequisites—Mathematics 51 and Machine Design 52.

Two exercises per week. 1st S.

54. Kinematics of Steam Machinery. Prof. Putnam.

A continuation of Machine Design 53, including the theory of the slide valve. For Electrical and Mechanical Juniors.

Prerequisites—Mathematics 51 and Machine Design 53.

Two exercises per week. 2d S.

56. Mechanism. Prof. Putnam.

A systematic study of the motions and forms of the various mechanisms occurring in machines and the manner of supporting and guiding the parts, together with the study of the mechanisms found in modern American machine tools and in mining machinery. For Chemical Seniors.

Three exercises per week. 2d S.

MATHEMATICS.

PROF. PETTEE, ASSOC. PROF. MOORE, ASST.PROF. STECK.

51. Algebra and Trigonometry. Prof. Moore, Prof. Steck.

The first half of the semester is devoted to a brief review of fundamental principles, a more advanced presentation of linear and quadratic equations, followed by an introduction to the theory of equations, determinants, variation and logarithms. The second half of the semester is devoted to trigonometry. For Engineering, Agricultural and Mechanic Arts Freshmen. Elective for Arts and Science Freshmen.

Four exercises per week. 1st S.

52. Analytic Geometry. Prof. Moore, Prof. Steck.

This course presents the elements of plane and solid analytic geometry; Cartesian and polar coördinates, the straight line, circle, and the conic sections; the derivative and its elementary applications; meth-

ods of analysis as illustrated by loci problems. For Engineering and Mechanic Arts Freshmen. Elective for Arts and Science Freshmen.

Prerequisite—*Mathematics 51.*

Four exercises per week. 2d S.

53. Solid Geometry. Prof. Steck.

The elements of the geometry of three dimensions. For Mechanic Arts Freshmen and for Engineering Freshmen entering without the subject. Elective for Agricultural and Arts and Science Freshmen.

Two exercises per week. 1st S.

54. Surveying. Prof. Pettee, Prof. Moore, Prof. Steck.

Lectures, recitations, field work and plotting; surveying with chain, compass, transit, sextant and plane table; special attention to adjustments, care and proper methods of using these instruments; the methods of determining areas; the use of the solar transit for the determination of the true meridian; levelling for profiles and contours; computing from field notes taken in connection with the course. For Agricultural and Mechanic Arts Freshmen. Elective for Arts and Science Freshmen.

Four exercises per week, last half of semester. 2d S.

55. Calculus. Prof. Moore, Prof. Steck.

Differentiation of algebraic and transcendental functions with applications to physical and allied problems. The simple methods of integration. For Engineering Sophomores. Elective for Arts and Science Sophomores.

Prerequisite—*Mathematics 52.*

Five exercises per week. 1st S.

56. Calculus. Prof. Moore, Prof. Steck.

A continuation of Course 55.

Prerequisite—*Mathematics 55.*

Three exercises per week. 2d S.

57. Differential Equations. Prof. Steck.

An elementary course devoted to the study of ordinary differential equations, especially those of the first and second orders, with applications to geometry, physics, and mechanics. Offered in alternate years. Given in 1915–1916.

Prerequisite—*Mathematics 56.*

Two exercises per week. 1st S.

58. Determinants. Prof. Steck.

An introductory course in determinants with applications to algebra and geometry. Offered in alternate years. Given in 1914–1915.

Prerequisite—*Mathematics 56.*

Two exercises per week. 2d S.

59. Theory of Equations. Prof. Moore.

An advanced course in the theory of equations. Offered in alternate years to Seniors and Juniors who have completed Mathematics 56. Given in 1914–1915.

Two exercises per week. 1st S.

60. History of Mathematical Science. Prof. Moore.

A course designed to acquaint those who intend to teach mathematics with the development of algebra, geometry, trigonometry, analysis and calculus. Lectures, readings and recitations. Offered in alternate years. Given in 1915-1916.

Prerequisite—Mathematics 56.

Two exercises per week. 2d S.

62. Astronomy. Prof. Pettee.

A short culture course designed to give the student a simple explanation of the many phenomena constantly exhibiting themselves in the universe and to acquaint him with the present state of astronomic science. Elective for Arts and Science Juniors and Seniors.

Two exercises per week. 2d S.

NOTE.—Students desiring to take Courses 57, 58, 59, or 60 should consult with the instructor before registering.

MECHANICAL ENGINEERING.

PROF. CARDULLO, ASST. PROF. MCKONE.

51. History of Mechanical Engineering. Prof. Cardullo.

A brief history of the development of the steam engine and other important mechanical inventions. For Electrical and Mechanical Freshmen.

One exercise per week, last half of semester. 1st S.

52. Theoretical Mechanics. Prof. McKone.

Composition and resolution of forces, conditions of equilibrium, center of gravity with especial attention to plane surfaces, friction, the simple machines, laws of motion, constrained motion, impact, work and energy, moment of inertia, particularly of plane surfaces. For Electrical and Mechanical Sophomores. Mathematics 56 is required as a parallel course.

Three exercises per week. 2d S.

53. Design of Machine Elements. Prof. Cardullo.

Strength of materials, and the design and proportion of machine parts, such as beams, shafts, gears, belts, springs, fastenings, etc. For Electrical and Mechanical Juniors.

Prerequisite—Mechanical Engineering 52.

Three exercises per week. 1st S.

54. Design of Machine Elements. Prof. Cardullo.

A continuation of Mechanical Engineering 53. For Electrical and Mechanical Juniors.

Prerequisite—Mechanical Engineering 53.

Three exercises per week. 2d S.

55. Designing and Drawing. Prof. McKone.

The application of Course 53 to practical problems worked out on the drafting board. For Electrical and Mechanical Juniors. Mechanical Engineering 53 is required as a parallel course.

Two exercises per week. 1st S.

56. Designing and Drawing. Prof. McKone.

A continuation of Course 55. For Electrical and Mechanical Juniors. Mechanical Engineering 54 is required as a parallel course.

Two exercises per week. 2d S.

57. Thermodynamics. Prof. Cardullo.

A study of the thermodynamic properties of gases and vapors, and the phenomena of operation of thermodynamic engines; analysis of energy losses and methods of minimization; interpretation of indicator and temperature-entropy diagrams; study of steam engines and turbines, boilers, gas engines and producers, and refrigerating machinery. For Electrical and Mechanical Juniors.

Prerequisite—Mathematics 56. Three exercises per week. 1st S.

58. Thermodynamics. Prof. Cardullo.

A continuation of Course 57. For Electrical and Mechanical Juniors.

Prerequisite—Mechanical Engineering 57.

Three exercises per week. 2d S.

59. Mechanical Laboratory. Prof. Cardullo, Prof. McKone.

A study of apparatus and methods of calibration used in engineering investigations; testing of iron, steel and wood; valve setting and indicator practice. For Electrical and Mechanical Juniors. Mechanical Engineering 57 is required as a parallel course.

Prerequisite—Mechanical Engineering 52.

Two exercises per week. 1st S.

60. Mechanical Laboratory. Prof. Cardullo, Prof. McKone.

A study of miscellaneous engineering materials and apparatus, and standard methods of testing; lubricants, cements, fuels, boilers, engines, pumps, power plant appliances and supplies, etc. For Electrical and Mechanical Juniors.

Prerequisite—Mechanical Engineering 59.

Two exercises per week. 2d S.

61. Hydraulics. Prof. Cardullo.

A study of the principles and practice of hydraulic machinery and measurements. For Electrical and Mechanical Seniors.

Prerequisite—Mechanical Engineering 53.

Three exercises per week. 1st S.

63. Materials of Engineering. Prof. McKone.

A study of the properties, commercial forms, methods of preparation and use of engineering materials. For Electrical and Mechanical Seniors. *Two exercises per week. 1st S.*

65. Mechanical Laboratory. Prof. Cardullo, Prof. McKone.

A critical study and detailed analysis of the performance of engineering apparatus, particularly of steam and gas engines, hydraulic apparatus, etc. For Electrical and Mechanical Seniors.

Prerequisite—Mechanical Engineering 60.

Two exercises per week. 1st S.

66. Mechanical Laboratory. Prof. McKone.

A continuation of Course 65 for Mechanical Seniors.

Prerequisite—Mechanical Engineering 65.

Three exercises per week. 2d S.

67. Advanced Design. Prof. Cardullo, Prof. McKone.

For Mechanical Engineering Seniors.

Three exercises per week. 1st S.

68. Advanced Design. Prof. Cardullo, Prof. McKone.

A continuation of Course 67 for Mechanical Engineering Seniors.

Five exercises per week. 2d S.

70. Industrial Administration. Prof. Cardullo.

A discussion of the principle and practice of systems of shop organization and management, cost keeping, wage payment, and methods of cost reduction; also a discussion of engineering finance, welfare work, labor conditions, factory laws, etc. For Mechanical and Mechanic Arts Seniors. Elective for others. *Three exercises per week. 2d S.*

71. Thermodynamics. Prof. McKone.

A study of the thermodynamic properties of substances and of power plant apparatus. For Chemical Engineering Seniors.

Two exercises per week. 1st S.

72. Manual Training. Prof. Cardullo.

A study of the purpose of manual training work, of the proper methods of teaching, and of the equipment of manual training schools. For Seniors in the Mechanic Arts Course. *One exercise per week. 2d S.*

METEOROLOGY.

PROF. PETTEE.

1. Meteorology.

Recitations and lectures on wind systems, precipitation, humidity, laws of storms and tornadoes and methods of prediction of atmospheric changes. For Agricultural Seniors. Elective for Arts and Science students.

Prerequisite—A course in Physics. Two exercises per week. 1st S.

***MILITARY SCIENCE AND TACTICS.**

LIEUT. HUNT.

Unless excused by proper authority, all male students are required to complete three years' satisfactory work in Drill and two years' satisfactory work in theoretical Military Science.

Drill.

Drill includes practical instruction in the following subjects: Close and Extended Order Drills by Company and Battalion, Advance and Rear Guards, Outposts, Marches, Ceremonies, Battalion Review, Parades and Guard Mounting, Guard Duty, Calisthenics and Gymnastics, Rifle Practice, First Aid to the Injured.

1. Military Drill.

For Freshmen. *Two exercises per week. 1st S.*

2. Military Drill.

A continuation of Drill 1. For Freshmen.
Two exercises per week. 2d S.

3. Military Drill.

For Sophomores *Two exercises per week. 1st S.*

4. Military Drill.

A continuation of Drill 3. For Sophomores.
Two exercises per week. 2d S.

5. Military Drill.

For Juniors. *Two exercises per week. 1st S.*

6. Military Drill.

A continuation of Drill 5. For Juniors.
Two exercises per week. 2d S.

*Students who are excused from Drill by competent authority are required to take additional work in some subject equivalent in hours to the military work from which they are excused.

7. Military Drill.

Elective for Seniors only.

*Two exercises per week. 1st S.***8. Military Drill.**

A continuation of Drill 7. Elective for Seniors only.

*Two exercises per week. 2d S.***Military Science.**

Military Science includes theoretical instruction in the principles of the military profession and in the theory of the specific movements taught on the drill ground and in the field, the military policy and history of the United States, the principles of military discipline and the administrative duties of military officers.

1. Infantry Drill Regulations.

Practical instruction and lectures. For Freshmen.

*One exercise per week. 1st S.***2. Manual of Guard Duty and Small Arms Firing Regulations.**

Practical instruction and lectures. For Freshmen.

*Prerequisite—Military Science 1. One exercise per week. 2d S.***3. Field Service Regulations.**

Lectures and discussions covering advance and rear guards, outposts, patrol, etc. For Sophomores.

*Prerequisite—Military Science 2. One exercise per week. 1st S.***4. Field Service Regulations.**

A continuation of Military Science 3. Practical field work. For Sophomores.

*Prerequisite—Military Science 3. One exercise per week. 2d S.***5. Field Engineering and Hasty Intrenching.**

Lectures and practical work. Elective for Juniors.

Prerequisite—Military Science 4, and open only to students who are taking Drill.

*One exercise per week. 1st S.***6. Military Map Reading and Sketching.**

Theoretical and practical work. Elective for Juniors.

Prerequisite—Military Science 4, and open only to students who are taking Drill.

*One exercise per week. 2d S.***7. Army Regulations, Organization and Administration.**

Lectures and preparation of military papers. Elective for Seniors.

Prerequisite—Military Science 4, and open only to students who are taking Drill.

One exercise per week. 1st S.

8. Army Regulations, Organization and Administration.

A continuation of Military Science 7. Elective for Seniors.

Prerequisite—*Military Science 7*, and open only to students who are taking Drill. *One exercise per week. 2d S.*

PHYSICAL CULTURE.

Unless excused by proper authority, all women students are required to complete three years' work in Physical Culture.

1. Physical Culture.

A course in free-hand calisthenics, dumb bell and wand drills, apparatus work and gymnasium dancing adapted to the needs of women students. *One exercise per week. 1st S.*

2. Physical Culture.

A continuation of Physical Culture 1. *One exercise per week. 2d S.*

PHYSICS.

PROF. FISHER, MR. PALMER.

51. Mechanics and Heat.

Lectures, illustrated by experiments, with note-books to be handed in at intervals and occasional written quizzes. As little mathematics is used in this course as is consistent with the proper interpretation of the lecture experiments. For Engineering, Agricultural and Mechanic Arts Sophomores. Elective for Arts and Science students.

Two exercises per week. 1st S.

52. Magnetism and Electricity.

A continuation of Course 51.

Two exercises per week. 2d S.

53. Physical Theory and Practice.

Course 51 is required either in parallel or previous to this course. Students electing Course 53 are advised to take analytics and calculus; the lack of them will prove a hindrance. For Mechanical and Electrical Sophomores. Elective for Arts and Science students.

Four exercises per week. 1st S.

54. Physical Theory and Practice.

A continuation of Course 53.

Prerequisites—*51 and 53.*

Four exercises per week. 2d S.

55. Mathematical Physics and Practice.

For Chemical Juniors. Elective for Arts and Science students. More advanced than 53 and 54. Courses 51 and 52 must precede or accompany this course. K in 51 or 52 will bar from this course.

Prerequisites—Mathematics 52, 55 and 56.

Four exercises per week. 1st S.

56. Mathematical Physics and Practice.

A continuation of Course 55. K in Mathematics 52, 55, or 56 will bar from this course.

Four exercises per week. 2d S.

58. Elementary Physics and Practice.

A review of physics of elementary grade, for students who do not desire a mathematical course, but need a study of principles, with laboratory applications. Mathematics 51 and Physics 51 and 52 must precede or accompany this. Required of Mechanic Arts Sophomores; elective for Arts and Science students. *Three exercises per week. 2d S.*

NOTE.—The following deposits are required at the beginning of the work of a year or part of a year: 51, 52,—75c for notes, not returnable; 53, 54, 55, 56—\$2; 58—\$1.00, for notes and damage, balance returnable at end of year.

NOTE.—Students desiring to be recommended as high school physics teachers must pass with grade of 80 in Courses 51, 52, 55, 56, or with grade of 85 in Courses 51, 52, 53, 54.

POLITICAL SCIENCE.

PROF. SCOTT.

2. Laws of Business.

Recitations supplemented by the discussion of cases. For Mechanic Arts Seniors. Elective for Arts and Science Juniors and Seniors and Agricultural Seniors.

Three exercises per week. 2d S.

3. American Constitutional Law.

Recitations, supplemented by a study of the decisions of the United States Supreme Court. Special attention is given to the connection between American constitutions and American political history. For Mechanic Arts Juniors. Elective for Arts and Science Juniors and Seniors and Agricultural Seniors.

Three exercises per week. 1st S.

PSYCHOLOGY.

PROF. GROVES.

52. Introduction to Psychology.

An introduction to the science of psychology which aims to give the student a systematic knowledge of the structure and functions of the mind. Simple experiments are used to illustrate fundamental laws of the mind and to develop in the student power in introspection. The principles of the science are related as closely as possible to the concrete experiences of the student. A discussion of normal psychology with only incidental attention to abnormal mind states. This course must be elected by all who wish to elect other courses in psychology. Sophomore subject.

Three exercises per week. 2d S.

53. Educational Psychology.

This course aims to set forth the scientific basis of teaching in so far as it is found in the science of psychology and to enable the student to investigate educational problems from the point of view of mental development in the child.

The course covers the following ground:

A. A study of the important mental processes that have direct bearing upon the problems of education.

B. A series of experiments with reference to educational principles and teaching problems of a psychological character.

C. Original investigation by the statistical method of concrete educational problems.

D. Study of the recent literature in the field of educational psychology.

Junior subject.

Prerequisite—Psychology 52.

Three exercises per week. 1st S.

***55. Social Psychology.**

A study of the development and the characteristics of the social mind of man.

The course covers the following ground:

A. The study in detail of the character and operation of the instincts, sentiments and emotions of man of primary importance for his life in society.

B. The study of the operation of the modern social mind, including a discussion of suggestibility, the crowd, mob mind, fashion, conventionality, custom-imitation, social conflict, discussion, public opinion and problems of social control.

Senior subject.

Prerequisite—Psychology 52.

Three exercises per week. 1st S

***57. Psychology of the Abnormal Mind.**

The study of abnormal forms of mentality in their relation to the operations of the normal mind. The course aims to illustrate fundamental laws of the mind and to contribute to the student useful information to one interested in psychology and social problems.

The course covers the following ground:

A. A study of sleep, dream-life, hypnosis, theory of the subconscious, mental diseases of psychological interest, psychotherapy, including the Freudian theory of psycho-analysis, principles of mental hygiene.

B. Individual study by the student of recent, original investigations in the field of abnormal psychology published in the technical periodicals.

Senior subject.

Prerequisite—Psychology 52.

Three exercises per week. 1st S

SHOP WORK.

PROF. CARDULLO, MR. PHILBRICK, MR. CAHILL.

51. Wood Work. Mr. Philbrick.

Exercises in carpentry work, joinery and pattern making. For Engineering and Mechanic Arts Freshmen. Elective for Arts and Science Freshmen.

Two exercises per week. 1st S.

51a. Wood Work. Mr. Philbrick.

Similar to Course 51. For Chemical Freshmen.

One exercise per week. 1st S.

52. Wood Work. Mr. Philbrick.

Wood work arranged to suit the needs of students taking the Mechanic Arts Course for Teachers. For Mechanic Arts Freshmen.

Two exercises per week. 2d S.

53. Wood Work. Mr. Philbrick.

Same as Course 51. For Agricultural Sophomores.

One exercise per week. 1st S.

55. Forging. Mr. Cahill.

For Agricultural Sophomores.

One exercise per week. 1st S

57. Forging. Mr. Cahill.

Exercises in upsetting, drawing, forming and welding. For Electrical and Mechanical Sophomores.

Two exercises per week. 1st S.

*Psychology 55 and 57 are given in alternate years. Psychology 57 is offered in 1914-1915.

59. Wood Work. Mr. Philbrick.

For Mechanic Arts Sophomores.

*Two exercises per week. 1st S.***60. Wood Work.** Mr. Philbrick.

A continuation of Course 59. For Mechanic Arts Sophomores.

*Three exercises per week. 2d S.***62. Machine Work.** Mr. Cahill.

A course in turning, facing, thread cutting, milling, shaping, scraping, filing and planing. For Electrical and Mechanical Sophomores.

*Two exercises per week. 2d S.***63. General Machine Work.** Mr. Cahill.

A continuation of Course 62. For Electrical and Mechanical Juniors.

*Two exercises per week. 1st S.***64. Manufacturing.** Mr. Cahill.

Construction and use of jigs and special fixtures; use of limit gauges, special tools, turret and screw machinery; manufacture of some simple machine, using special appliances. For Electrical Juniors. Elective for Mechanical Juniors.

*Two exercises per week. 2d S.***65. Wood Work.** Mr. Philbrick.

For Mechanic Arts Juniors.

*Three exercises per week. 1st S.***66. Forge Work.** Mr. Cahill.

For Mechanic Arts Juniors.

*Three exercises per week. 2d S.***68. Machine Work.** Mr. Cahill.

Same as Course 62. For Chemical Juniors.

*Two exercises per week. 2d S.***69. Advanced Shop Work.** Mr. Cahill, Mr. Philbrick.

Foundry practice; advanced pattern making and advanced machine shop practice. For Mechanical Seniors.

*Two exercises per week. 1st S.***70. Advanced Shop Work.** Mr. Cahill.

A continuation of Course 69. For Mechanical Seniors.

*Two exercises per week. 2d S.***71. Machine Work.** Mr. Cahill.

Machine work arranged to meet the needs of students taking the Mechanic Arts Course for Teachers. For Mechanic Arts Seniors.

*Two exercises per week. 1st S.***72. Machine Work.** Mr. Cahill.

A continuation of Shop Work 71.

Three exercises per week. 2d S.

SOCIOLOGY.

PROF. GROVES.

51. Primitive Man and Social Origins.

An elementary study of life of primitive man, the beginnings of human society and the factors that condition social evolution. The course aims to introduce the student to a field of investigation of special value to the student of the social sciences. Special attention is given to the study of primitive social control. Ethnological readings are required.

The course includes a discussion of the following topics: Geographical basis of human society, origin and antiquity of primitive man, races, race crossing, prehistoric culture periods, primitive life conditions including food, housing, inventions, slavery, art, dress, marriage, family forms and customs, totemism, tabu, magic, medicine men, ceremonies, secret societies, clan and tribal organization.

Special attention will be given to the theories of human association. Sophomore subject. *Three exercises per week. 1st S.*

52. Social Pathology and Modern Philanthropy.

This course in modern social problems covers the following ground:

A. Study of the nature, origin and proper treatment of dependent, defective and delinquent classes, including an introduction to the theories of criminal anthropology.

B. Study of contemporary social problems and movements for social betterment as reported in *The Survey*.

C. Thesis work on the part of the student based upon first-hand study of some concrete social problem.

Senior subject.

Prerequisite—Sociology 51 for General Arts and Science students.

Three exercises per week. 2d S.

53. Mental Defectives.

A sociological study of mental defectiveness with special attention to the problem of social prophylaxis. A course designed for students who plan to engage in social or educational work of an administrative or institutional character or who plan to do graduate work in the field of psychology or sociology.

The course covers the following ground:

A. The study of amentia, including a discussion of the number, causation, pathology, classification, characteristics, problem of diagnosis and prognosis and the treatment of aments.

B. The study of the constitution and function of the psychological clinic, method of classifying clinic cases, the Binet measuring scale, the sociological relations of the clinic.

C. Individual study by the student of typical cases of mental defectiveness by the case method.

D. An introduction to the literature of amentia.

Senior subject.

Prerequisites—Psychology 52 and Sociology 51.

Three exercises per week. 1st S.

54. Rural Sociology.

A study of the social significance, conditions and resources of American country life with the purpose of developing community leadership. The course includes a discussion of the following:

A. Rural ethnology and sociology. Land basis of society, origin of primitive agriculture, animal and plant life as factors in human progress, modern agriculture and population, migration, immigration and city drift.

B. Rural social psychology. Imitation and city influence, suggestibility, conflict, discussion, public opinion and community pride.

C. Rural social pathology. Dependents, defectives and delinquents in their relation to the country community, problem of rural police protection, moral problems of the rural community.

D. Rural progress. Survey making, communication, community advertising, associations and clubs, rural education, wider use of rural school houses, rural school gardens, community competition, fairs, recreation, the rural church and welfare work.

Senior subject.

Prerequisite—Sociology 51, except for Agricultural Seniors.

Three exercises per week. 2d S.

SPANISH.

PROF. WHORISKEY, ASST. PROF. WHITMAN.

1. Elementary Spanish. Prof. Whitman.

Elements of Spanish grammar. Reading of simple stories; conversation and dictation. Elective for Arts and Science students.

Three exercises per week. 1st S.

2. A Continuation of Spanish 1.

Prerequisite—Spanish 1.

Three exercises per week. 2d S.

ZOOLOGY.

PROF. JACKSON, MR. BATCHELDER.

The courses in Zoölogy are arranged in sequence as follows: Students desiring a general scientific knowledge of the subject should elect from Groups A, C and D. For students desiring a more practical knowledge of physiology, hygiene and sanitation courses should be chosen from

Group B. Those students desiring to teach the subject, or contemplating entering the medical profession should consult the head of the department as to sequence of courses. Any course offered may be taken by students who have completed the required prerequisites.

Group A. Systematic Zoölogy.

51. General Zoölogy.

A study of the fundamental principles of life, the nature of protoplasm, structure of the cell, and the process of cell division. The structure, habits and life history of the different types of invertebrate animals will be discussed, the economic aspect being especially emphasized. For Agricultural and Home Economics Freshmen and Mechanic Arts Sophomores. Elective for Arts and Science students.

Three exercises per week. 1st S.

52. General Zoölogy.

A study of the structure, habits, and life history of vertebrate animals. Their economic aspect will be especially emphasized and their importance and relation to man. For Agricultural and Home Economics Freshmen and Mechanic Arts Sophomores. Elective for Arts and Science students.

Prerequisite—Zoölogy 51.

Three exercises per week. 2d S.

53. Faunal Zoölogy. (Invertebrate.)

A study of the habits, life history and identification of local, invertebrate animals, exclusive of the insects. The work will consist of field trips, lectures and laboratory practice in the identification of the material collected.

Prerequisites—Zoölogy 51 and 52. Three exercises per week. 1st S.

54. Faunal Zoölogy. (Vertebrate.)

A study of the habits, life history and identification of vertebrate animals with special reference to their economic importance. More advanced than Course 52, and systematic rather than anatomical.

Prerequisites—Zoölogy 51 and 52. Three exercises per week. 2d S.

55. Systematic Entomology.

The collection and identification of insects without regard to their economic importance.

Prerequisites—Zoölogy 51 and 52. Three exercises per week. 1st S.

56. Ornithology.

A study of the classification, identification and economic importance of the birds. Lectures, field trips and written reports.

Prerequisites—Zoölogy 51 and 52. Three exercises per week. 2d S.

Group B. Physiology, Hygiene and Sanitation.**57. Human Anatomy and Physiology.**

A detailed study of the structure, physiology and histology of the human body. The various functions of the body will be discussed primarily with the view of forming a basis for the following course.

Prerequisites—Zoölogy 51 and 52. Three exercises per week. 1st S.

58. Hygiene and Sanitation.

A study of the fundamental principles of hygiene and sanitation. The principal human bacterial diseases will be discussed; the method of infection and means of prevention.

Prerequisites—Zoölogy 51, 52 and 57. Three exercises per week. 2d S.

59. Human Pathology.

The physiological aspect of the principal human diseases.

Prerequisites—Zoölogy 51, 52, 57 and 58.

Three exercises per week. 1st S.

60. Embryology.

A study of the development of the vertebrate embryo. The laboratory work will be principally with the frog and the chick. The lecture work will include human embryology.

Prerequisites—Zoölogy 51, 52, 57 and 58.

Three exercises per week. 2d S.

61. Advanced Neurology.

A detailed study of the structure and physiology of the human nervous system. Especially adapted for students of Psychology.

Prerequisites—Zoölogy 51, 52, 57 and 58.

Three exercises per week. 1st S.

Group C. Philosophical Zoölogy.**62. Experimental Zoölogy.**

An experimental study of the fundamental nature of protoplasm and its various physical and chemical properties. Offered in 1914-1915.

Prerequisites—Zoölogy 51, 52, 57, 58, 60.

Three exercises per week. 2d S.

63. Evolution.

Lectures dealing with the theoretical side of the problems of evolution. The history of evolution and various theories of heredity, variation and selection will be discussed.

Prerequisites—Zoölogy 51, 52, 57, 58. Three exercises per week. 1st S.

64. Eugenics.

A study of the principles of eugenics and the problems of evolution applied to human life.

Prerequisites—Zoölogy 51, 52, 57, 58, 63.

Three exercises per week. 2d S.

Group D. Anatomical Zoölogy.

65. Comparative Anatomy of the Invertebrates.

A detailed study of the structure of the different types of the invertebrates exclusive of the insects. Conference and laboratory work.

Prerequisites—Zoölogy 51 and 52. *Three exercises per week. 1st S.*

66. Comparative Anatomy of the Vertebrates.

A detailed study of the structure of the different types of the vertebrates, with special reference to the nervous system. Conference and laboratory work.

Prerequisites—Zoölogy 51 and 52. *Three exercises per week. 2d S.*

67. Histology.

A detailed study of the structure of the tissues of the human body, cell specialization, and the manner in which the tissues are combined into organs. The work will be of a technical nature and adapted for advanced students in Human Physiology.

Prerequisites—Zoölogy 51, 52, 57 and 58.

Three exercises per week. 1st S.

68. Insect Anatomy.

A study of the anatomy of the different types of insects. Especially adapted for students in Entomology.

Prerequisites—Zoölogy 51, 52, 55. *Three exercises per week. 2d S.*

Group E. Advanced Zoölogy.

69. Advanced Zoölogy.

Arranged to suit the individual needs of those who wish to specialize in Zoölogy.

Open only to students by permission of the head of the department.

Credit and hours to be arranged. 1st S.

70. Advanced Zoölogy.

A continuation of Course 69. *Credit and hours to be arranged. 2d S.*

71. Vocational Zoölogy.

A discussion of the principles of teaching Zoölogy, and the application of Zoölogy to other lines of work.

Open only to students by special permission.

Three exercises per week. 1st S.

72. Thesis.

Open only to students by permission from the head of the department.

Two exercises per week. 2d S.

COURSES OF STUDY.

(For details, see Description of Studies.)

AGRICULTURAL DIVISION.

All Courses.

FRESHMAN YEAR, FIRST SEMESTER.

	Hours
<i>Chemistry 51</i>	Inorganic Chemistry 3
<i>Drill 1</i>	Military Drill 1
<i>English 51</i>	English Composition 3
* <i>French 1 or</i>	Elementary French } 3
* <i>German 1</i>	Elementary German }
<i>Mathematics 51</i>	Algebra and Trigonometry 4
<i>Military Science 1</i>	Infantry Drill Regulations 1
<i>Zoölogy 51</i>	General Zoölogy 3

FRESHMAN YEAR, SECOND SEMESTER.

<i>Chemistry 52</i>	Inorganic Chemistry 3
<i>Drawing 54</i>	Industrial Drawing 2
<i>Drill 2</i>	Military Drill 1
<i>English 52</i>	English Composition 3
* <i>French 2 or</i>	Elementary French } 3
* <i>German 2</i>	Elementary German }
<i>Mathematics 54</i>	Surveying 2
<i>Military Science 2</i>	Manual of Guard Duty 1
<i>Zoölogy 52</i>	General Zoölogy 3

SOPHOMORE YEAR, FIRST SEMESTER.

<i>Agronomy 51</i>	Farm Equipment and Machinery 3
<i>Animal Husbandry 51</i>	Breeds of Live Stock 4
<i>Botany 51</i>	General Botany 3
<i>Chemistry 52</i>	Introductory Qualitative Analysis 2
<i>Drill 3</i>	Military Drill 1
<i>Military Science 3</i>	Field Service Regulations 1
<i>Physics 51</i>	Mechanics and Heat 2
<i>Shop Work 53</i>	Wood Work 1
<i>Shop Work 55</i>	Forging 1

*Any four-year agricultural student who presents at least four years' work in two foreign languages for entrance may substitute other subjects for the French or German of the Freshman year.

SOPHOMORE YEAR, SECOND SEMESTER.

	Hours
<i>Botany 52</i>	General Botany..... 3
<i>Chemistry 60</i>	Quantitative Analysis..... 3
<i>Dairying 52</i>	Farm Dairying..... 3
<i>Drill 4</i>	Military Drill..... 1
<i>Horticulture 52</i>	Olericulture..... 2
<i>Horticulture 54</i>	Practical Pomology..... 3
<i>Military Science 4</i>	Field Service Regulations..... 1
<i>Physics 52</i>	Magnetism and Electricity..... 2

Animal Husbandry and Dairy Course.

JUNIOR YEAR, FIRST SEMESTER.

<i>Agronomy 53</i>	Farm Crops..... 3
* <i>Animal Husbandry 55 or</i>	Veterinary Anatomy }
* <i>Dairying 53</i>	Buttermaking }
* <i>Animal Husbandry 61 or</i>	Poultry }
* <i>Entomology 1</i>	Economic Entomology }
<i>Drill 5</i>	Military Drill..... 1
<i>Forestry 51</i>	Principles of Forestry..... 3
<i>Geology 51</i>	Elementary Geology..... 3
<i>Elective</i>	 2

JUNIOR YEAR, SECOND SEMESTER.

<i>Agronomy 52</i>	Soils..... 3
<i>Animal Husbandry 54</i>	Feeds and Feeding..... 3
* <i>Animal Husbandry 56 or</i>	Veterinary Medicine }
* <i>Dairying 58</i>	Cheese Making }
<i>Botany 56</i>	Bacteriology..... 3
<i>Dairying 54</i>	Market Milk..... 3
<i>Drill 6</i>	Military Drill..... 1
<i>Elective</i>	 2

SENIOR YEAR, FIRST SEMESTER.

<i>Agronomy 55</i>	Farm Management..... 3
<i>Animal Husbandry 57</i>	Breeding and Management..... 3
<i>Economics 1</i>	Elementary Economics..... 3
<i>Meteorology 1</i>	Meteorology..... 2
<i>Elective</i>	 5

SENIOR YEAR, SECOND SEMESTER.

<i>Agronomy 54</i>	Fertilizers..... 3
<i>Economics 8</i>	Agricultural Economics..... 3
<i>English 56</i>	Argumentation and Debating... 3
<i>Elective</i>	 7

* Elective.

Forestry Course.

JUNIOR YEAR, FIRST SEMESTER.

	Hours
<i>Botany</i> 53	Plant Physiology..... 3
<i>Drill</i> 5	Military Drill..... 1
<i>Entomology</i> 1	Economic Entomology..... 3
<i>Forestry</i> 53	Dendrology..... 4
<i>Forestry</i> 55	Silviculture..... 5
<i>Geology</i> 51	Elementary Geology..... 3

JUNIOR YEAR, SECOND SEMESTER.

<i>Agronomy</i> 52	Soils..... 3
<i>Botany</i> 54	Plant Histology..... 3
<i>Drill</i> 6	Military Drill..... 1
<i>Forestry</i> 52	Silviculture..... 3
<i>Forestry</i> 54	Forest Mensuration..... 3
<i>Horticulture</i> 56	Landscape Gardening..... 3
<i>Elective</i>	 2

SENIOR YEAR, FIRST SEMESTER.

<i>Botany</i> 57	Plant Pathology..... 3
<i>Economics</i> 1	Elementary Economics..... 3
<i>Forestry</i> 57	Forest Protection..... 2
<i>Forestry</i> 59	Practice of Forestry..... 3
<i>Meteorology</i> 1	Meteorology..... 2
<i>Elective</i>	 3

SENIOR YEAR, SECOND SEMESTER.

<i>Economics</i> 8	Agricultural Economics..... 3
<i>English</i> 56	Argumentation and Debating .. 3
<i>Forestry</i> 56	Forest Management..... 4
<i>Elective</i>	 6

Horticultural Course.

JUNIOR YEAR, FIRST SEMESTER.

<i>Agronomy</i> 53	Farm Crops..... 3
<i>Botany</i> 53	Plant Physiology..... 3
<i>Drill</i> 5	Military Drill..... 1
<i>Entomology</i> 1	Economic Entomology..... 3
<i>Forestry</i> 51	Principles of Forestry..... 3
<i>Geology</i> 51	Elementary Geology..... 3
<i>Horticulture</i> 53	Greenhouse Management..... 3

JUNIOR YEAR, SECOND SEMESTER.

Hours

<i>Agronomy</i> 52	Soils.....	3
<i>Animal Husbandry</i> 54	Feeds and Feeding.....	3
<i>Drill</i> 6	Military Drill.....	1
<i>Horticulture</i> 56	Landscape Gardening.....	3
<i>Horticulture</i> 58	Nursery Management.....	3
<i>Horticulture</i> 60	Floriculture.....	2
<i>Elective</i>		3

SENIOR YEAR, FIRST SEMESTER.

<i>Agronomy</i> 55	Farm Management.....	3
<i>Botany</i> 57	Plant Pathology.....	3
<i>Economics</i> 1	Elementary Economics.....	3
<i>Horticulture</i> 55	Systematic Pomology.....	4
<i>Horticulture</i> 57	Evolution of Plants.....	2
<i>Meteorology</i> 1	Meteorology.....	2

SENIOR YEAR, SECOND SEMESTER.

<i>Agronomy</i> 54	Fertilizers.....	3
<i>Economics</i> 8	Agricultural Economics.....	3
<i>English</i> 56	Argumentation and Debating ..	3
<i>Horticulture</i> 62	Horticultural Seminar.....	1
<i>Elective</i>		5

General or Teaching Course.

JUNIOR YEAR, FIRST SEMESTER.

<i>Agronomy</i> 53	Farm Crops.....	3
<i>Botany</i> 53	Plant Physiology.....	3
<i>Drill</i> 5	Military Drill.....	1
<i>Entomology</i> 1	Economic Entomology.....	3
<i>Forestry</i> 51	Principles of Forestry.....	3
<i>Geology</i> 51	Elementary Geology.....	3
<i>Elective</i>		2

JUNIOR YEAR, SECOND SEMESTER.

<i>Agronomy</i> 52	Soils.....	3
<i>Animal Husbandry</i> 54	Feeds and Feeding.....	3
<i>Dairying</i> 54	Market Milk.....	3
<i>Drill</i> 6	Military Drill.....	1
<i>Elective</i>		8

NOTE—Students taking the General or Teaching Course who expect to teach science and agriculture should elect Psychology 52 in the second semester of the Junior Year and Psychology 53 and Sociology 54 in the Senior Year.

SENIOR YEAR, FIRST SEMESTER.

	Hours
<i>Agronomy 55</i>	Farm Management..... 3
<i>Economics 1</i>	Elementary Economics..... 3
<i>Horticulture 57</i>	Evolution of Plants..... 2
<i>Meteorology 1</i>	Meteorology..... 2
<i>Elective</i>	 6

SENIOR YEAR, SECOND SEMESTER.

<i>Agronomy 54</i>	Fertilizers..... 3
<i>Economics 8</i>	Agricultural Economics..... 3
<i>English 56</i>	Argumentation and Debating .. 3
<i>Elective</i>	 7

ARTS AND SCIENCE DIVISION.

General Arts and Science Course.

FRESHMAN YEAR, FIRST SEMESTER.

All elective except English 51 and 52, Drill and Military Science, and, for women, Home Economics 1 and Physical Culture.

<i>Chemistry 51 or</i> }	Inorganic Chemistry..... 3
<i>Chemistry 55</i> }	
<i>Drawing 51</i>	Engineering Drawing..... 2
<i>Drill 1</i>	Military Drill..... 1
<i>English 51</i>	English Composition and Rhetoric. 3
<i>French 1 or</i>	Elementary French }
<i>German 1</i>	Elementary German }
<i>History 1</i>	European History, 476-1492..... 3
<i>Home Economics 1</i>	Personal Hygiene..... 1
<i>Home Economics 3 or</i>	Food Economics }
<i>Home Economics 5</i>	Clothing }
<i>Latin 1</i>	Livy..... 3
<i>Mathematics 51</i>	Algebra and Trigonometry..... 4
<i>Mathematics 53</i>	Solid Geometry..... 2
<i>Military Science 1</i>	Infantry Drill Regulations..... 1
<i>Physical Culture 1</i>	Physical Culture..... 1
<i>Shop Work 51</i>	Wood Work..... 2
<i>Zoölogy 51</i>	General Zoölogy..... 3

FRESHMAN YEAR, SECOND SEMESTER.

<i>Chemistry 52 or</i>	Inorganic Chemistry }
<i>Chemistry 56</i>	Special Chemistry }
<i>Drawing 58</i>	Descriptive Geometry..... 2

	Hours
<i>Drawing</i> 64	Free-hand or Charcoal Drawing... 2
<i>Drill</i> 2	Military Drill..... 1
<i>Economics</i> 2	Commercial Geography..... 3
<i>English</i> 52	English Composition and Rhetoric 3
<i>English</i> 54	Introduction to English Literature . 3
<i>French</i> 2 or	Elementary French }
<i>German</i> 2	Elementary German }
<i>History</i> 2	European History, 1492-1715..... 3
<i>Home Economics</i> 2	Household Management..... 3
<i>Latin</i> 2	Horace..... 3
<i>Mathematics</i> 52	Analytic Geometry..... 4
<i>Mathematics</i> 54	Surveying (last half of semester)... 2
<i>Military Science</i> 2	Manual of Guard Duty..... 1
<i>Physical Culture</i> 2	Physical Culture..... 1
<i>Zoölogy</i> 52	General Zoölogy..... 3

SOPHOMORE YEAR, FIRST SEMESTER.

All elective except Drill, Military Science and Physical Culture.

<i>Botany</i> 51	General Botany..... 3
<i>Chemistry</i> 57	Special Organic Chemistry..... 3
<i>Chemistry</i> 59	Introductory Qualitative Analysis.. 2
<i>Drill</i> 3	Military Drill..... 1
<i>Economics</i> 1	Elementary Economics..... 3
<i>English</i> 53	Advanced Composition and Literary Criticism..... 3
<i>Entomology</i> 1	Economic Entomology..... 3
<i>French</i> 3	French Prose..... 3
<i>German</i> 3	German Prose..... 3
<i>History</i> 3	European History, 1715-1815..... 3
<i>Home Economics</i> 7	Foods..... 3
<i>Latin</i> 3	Terence..... 3
<i>Mathematics</i> 55	Calculus..... 5
<i>Military Science</i> 3	Field Service Regulations..... 1
<i>Physical Culture</i> 1	Physical Culture..... 1
<i>Physics</i> 51	Mechanics and Heat..... 2
<i>Physics</i> 53	Physical Theory and Practice..... 4
<i>Sociology</i> 51	Primitive Man and Social Origins.. 3
<i>Spanish</i> 1	Elementary Spanish..... 3
<i>Zoölogy</i> 51	General Zoölogy..... 3
<i>Zoölogy</i> 53	Faunal Zoölogy (Invertebrate) ... 3
<i>Zoölogy</i> 57	Human Anatomy and Physiology.. 3

SOPHOMORE YEAR, SECOND SEMESTER.

	Hours
<i>Botany 52</i>	General Botany..... 3
<i>Chemistry 68</i>	Organic Chemistry..... 3
<i>Drill 4</i>	Military Drill..... 1
<i>Economics 2</i>	Commercial Geography..... 3
<i>English 54</i>	Introduction to English Literature. 3
<i>English 56</i>	Argumentation..... 3
<i>Entomology 2</i>	Applied Economic Entomology... 3
<i>Entomology 4</i>	Household Insects..... 2
<i>French 4</i>	French Prose..... 3
<i>German 4</i>	German Prose..... 3
<i>History 4</i>	European History since 1815..... 3
<i>Home Economics 8</i>	Foods..... 4
<i>Home Economics 10</i>	Household Art and Design..... 2
<i>Latin 4</i>	Tacitus..... 3
<i>Mathematics 56</i>	Calculus..... 3
<i>Military Science 4</i>	Field Service Regulations..... 1
<i>Physical Culture 2</i>	Physical Culture..... 1
<i>Physics 52</i>	Magnetism and Electricity..... 2
<i>Physics 54</i>	Physical Theory and Practice.... 4
<i>Physics 58</i>	Elementary Physics and Practice.. 3
<i>Psychology 52</i>	Introduction to Psychology..... 3
<i>Spanish 2</i>	Elementary Spanish..... 3
<i>Zoölogy 52</i>	General Zoölogy..... 3
<i>Zoölogy 54</i>	Faunal Zoölogy (Vertebrate)..... 3

JUNIOR YEAR, FIRST SEMESTER.

All elective except Drill and Physical Culture.

<i>Botany 53</i>	Plant Physiology..... 3
<i>Botany 55</i>	General Bacteriology..... 3
<i>Botany 57</i>	Plant Pathology..... 3
<i>Chemistry 59</i>	Introductory Qualitative Analysis . 2
<i>Chemistry 65</i>	Quantitative Analysis 4
<i>Chemistry 69</i>	Organic Chemistry..... 2
<i>Dairying 51</i>	Domestic Dairying..... 3
<i>Drill 5</i>	Military Drill..... 1
<i>Economics 5 or</i>	Labor Problems }
<i>Economics 7</i>	Socialism }
<i>Economics 9</i>	Corporation Finance..... 3
<i>Economics 11</i>	Economic Problems of the Home.. 2
<i>English 53</i>	Advanced Composition and Liter- ary Criticism 3
<i>English 55 or</i>	The English Novel }
<i>English 57</i>	Modern English Poetry }

	Hours
<i>Entomology 1</i>	Economic Entomology 3
<i>Entomology 3</i>	Insects of Domestic Animals 2
<i>Entomology 5</i>	Advanced Economic Entomology . . 2
<i>French 5 or</i> }	French Literature and Composition 3
<i>French 7</i> }	
<i>Geology 51</i>	Elementary Geology 3
<i>German 5 or</i>	Goethe }
<i>German 7 or</i>	Schiller } 3
<i>German 13</i>	Sudermann }
<i>German 9 or</i> }	German Composition and Conver-
<i>German 11</i> }	sation 3
<i>History 5</i>	American History to 1801 3
<i>Mathematics 57 or</i>	Differential Equations }
<i>Mathematics 59</i>	Theory of Equations } 2
<i>Military Science 5</i>	Field Engineering and Hasty In-
	trenching 1
<i>Physical Culture 1</i>	Physical Culture 1
<i>Physics 55</i>	Mathematical Physics and Practice 4
<i>Political Science 3</i>	American Constitutional Law 3
<i>Psychology 53</i>	Educational Psychology 3
<i>Psychology 55 or</i>	Social Psychology }
<i>Psychology 57</i>	Psychology of the Abnormal Mind } 3
<i>Sociology 53</i>	Mental Defectives 3
<i>Spanish 1</i>	Elementary Spanish 3
<i>Zoölogy 57</i>	Human Anatomy and Physiology . . 3
<i>Zoölogy 59</i>	Human Pathology 3

JUNIOR YEAR, SECOND SEMESTER.

<i>Botany 54</i>	Plant Histology 2
<i>Botany 56</i>	Bacteriology 3
<i>Chemistry 68</i>	Organic Chemistry 3
<i>Drill 6</i>	Military Drill 1
<i>Economics 4 or</i>	Money and Banking }
<i>Economics 6</i>	Public Finance and Taxation } . . 3
<i>Economics 8</i>	Agricultural Economics 3
<i>English 54</i>	Introduction to English Literature 3
<i>English 56</i>	Argumentation 3
<i>English 58 or</i>	English Drama }
<i>English 62</i>	Shakespeare's Plays } 3
<i>English 60</i>	American Literature 4
<i>Entomology 4</i>	Household Insects 2
<i>Entomology 6</i>	Advanced Economic Entomology . . 3
<i>French 6 or</i> }	French Literature and Composition 3
<i>French 8</i> }	

	Hours
<i>Geology</i> 54	<i>Mineralogy</i> 2
<i>German</i> 6 or	<i>Goethe</i> }
<i>German</i> 8 or	<i>Schiller</i> } 3
<i>German</i> 14	<i>Sudermann</i> }
<i>German</i> 10 or	<i>German Composition and Conver-</i>
<i>German</i> 12	<i>sation</i> 3
<i>History</i> 6	<i>Constitutional and Political His-</i>
	<i>tory of U. S. (1801-1860)</i> 3
<i>Mathematics</i> 58 or	<i>Determinants</i> }
<i>Mathematics</i> 60	<i>History of Mathematics</i> } 2
<i>Military Science</i> 6	<i>Military Map Reading and Sketch-</i>
	<i>ing</i> 1
<i>Physical Culture</i> 2	<i>Physical Culture</i> 1
<i>Physics</i> 56	<i>Mathematical Physics and Practice</i> 4
<i>Political Science</i> 2	<i>Laws of Business</i> 3
<i>Psychology</i> 52	<i>Introduction to Psychology</i> 3
<i>Sociology</i> 52	<i>Social Pathology and Modern Phil-</i>
	<i>anthropy</i> 3
<i>Spanish</i> 2	<i>Elementary Spanish</i> 3
<i>Zoölogy</i> 54	<i>Faunal Zoölogy</i> 3
<i>Zoölogy</i> 66	<i>Comparative Anatomy of the Ver-</i>
	<i>tebrates</i> 3

SENIOR YEAR, FIRST SEMESTER.

All elective.

<i>Botany</i> 53	<i>Plant Physiology</i> 3
<i>Botany</i> 55	<i>General Bacteriology</i> 3
<i>Botany</i> 57	<i>Plant Pathology</i> 3
<i>Chemistry</i> 71	<i>Organic Chemical Laboratory</i> 3
<i>Dairying</i> 51	<i>Domestic Dairying</i> 3
<i>Drill</i> 7	<i>Military Drill</i> 1
<i>Economics</i> 5 or	<i>Labor Problems</i> }
<i>Economics</i> 7	<i>Socialism</i> } 3
<i>Economics</i> 9	<i>Corporation Finance</i> 3
<i>Economics</i> 11	<i>Economic Problems of the Home</i> .. 2
<i>English</i> 55 or	<i>English Novel</i> }
<i>English</i> 57	<i>Modern English Poetry</i> } 3
<i>Entomology</i> 1	<i>Economic Entomology</i> 3
<i>Entomology</i> 3	<i>Insects of Domestic Animals</i> 2
<i>Entomology</i> 5	<i>Advanced Economic Entomology</i> .. 3
<i>French</i> 5 or }	<i>French Literature and Composition</i> 3
<i>French</i> 7 }	
<i>Geology</i> 51	<i>Elementary Geology</i> 3

FOUR-YEAR COURSES.

III

		Hours
<i>German 5 or</i>	Goethe	} 3
<i>German 7 or</i>	Schiller	
<i>German 13</i>	Sudermann	
<i>German 9 or</i>	German Composition and Conver-	} 3
<i>German 11</i>	sation	
<i>History 7</i>	Constitutional and Political History	} 3
	of U. S. since 1860	
<i>Mathematics 57 or</i>	Differential Equations	} 2
<i>Mathematics 59</i>	Theory of Equations	
<i>Meteorology 1</i>	Meteorology	2
<i>Military Science 7</i>	Army Regulations	1
<i>Political Science 3</i>	American Constitutional Law	3
<i>Psychology 57</i>	Psychology of the Abnormal Mind	3
<i>Sociology 53</i>	Mental Defectives	3
<i>Spanish 1</i>	Elementary Spanish	3
<i>Thesis</i>		2
<i>Zoölogy 69</i>	Advanced Zoölogy	
<i>Zoölogy 71</i>	Vocational Zoölogy	3

SENIOR YEAR, SECOND SEMESTER.

<i>Botany 54</i>	Plant Histology	2
<i>Botany 56</i>	Bacteriology	3
<i>Chemistry 76</i>	Physical and Electro Chemistry	3
<i>Drill 8</i>	Military Drill	1
<i>Economics 4 or</i>	Money and Banking	} ... 3
<i>Economics 6</i>	Public Finance and Taxation	
<i>Economics 8</i>	Agricultural Economics	3
<i>English 58 or</i>	English Drama	} 3
<i>English 62</i>	Shakespeare's Plays	
<i>English 60</i>	American Literature	4
<i>Entomology 2</i>	Applied Economic Entomology	3
<i>Entomology 4</i>	Household Insects	2
<i>French 6 or</i>	French Literature and Composition	3
<i>French 8</i>		
<i>Geology 52</i>	Historical Geology	3
<i>German 6 or</i>	Goethe	} 3
<i>German 8 or</i>	Schiller	
<i>German 14</i>	Sudermann	
<i>German 10 or</i>	German Composition and Conversa-	} 3
<i>German 12</i>	tion	
<i>Mathematics 58 or</i>	Determinants	} 2
<i>Mathematics 60</i>	History of Mathematical Science	
<i>Mathematics 62</i>	Astronomy	2
<i>Military Science 8</i>	Army Regulations	1

	Hours
<i>Political Science</i> 2	Laws of Business..... 3
<i>Sociology</i> 54	Rural Sociology..... 3
<i>Spanish</i> 2	Elementary Spanish..... 3
<i>Thesis</i>	 1 or 2
<i>Zoölogy</i> 56	Ornithology..... 3
<i>Zoölogy</i> 58	Hygiene and Sanitation..... 3
<i>Zoölogy</i> 64	Eugenics..... 3
<i>Zoölogy</i> 68	Insect Anatomy..... 3
<i>Zoölogy</i> 70	Advanced Zoölogy.....
<i>Zoölogy</i> 72	Thesis..... 2

Home Economics Course.

FRESHMAN YEAR, FIRST SEMESTER.

Required Subjects:

<i>Chemistry</i> 55	Inorganic Chemistry..... 3
<i>English</i> 51	English Composition and Rhetoric. 3
<i>Home Economics</i> 1	Personal Hygiene..... 1
<i>Home Economics</i> 3 or	Food Economics..... 3
<i>Home Economics</i> 5	Clothing..... 3
<i>Physical Culture</i> 1	Physical Culture..... 1
<i>Zoölogy</i> 51	General Zoölogy..... 3

*Elective Subjects:	Total hours..... 3 or 4
<i>French</i> 1	Elementary French..... 3
<i>German</i> 1	Elementary German 3
<i>History</i> 1	European History, 476-1492..... 3
<i>Mathematics</i> 51	Algebra and Trigonometry..... 4

FRESHMAN YEAR, SECOND SEMESTER.

Required Subjects:

<i>Chemistry</i> 56	Special Chemistry..... 3
<i>Drawing</i> 60	Mechanical Drawing..... 2
<i>English</i> 52	English Composition and Rhetoric. 3
<i>Home Economics</i> 2	Household Methods and Manage- ment..... 3
<i>Physical Culture</i> 2	Physical Culture..... 1
<i>Zoölogy</i> 52	General Zoölogy..... 3

*Elective Subjects:	Total hours..... 3
<i>English</i> 54	Introduction to English Literature. 3
<i>French</i> 2	Elementary French..... 3
<i>German</i> 2	Elementary German..... 3
<i>History</i> 2	European History, 1492-1715..... 3

*Other subjects may be offered for the elective requirement.

FOUR-YEAR COURSES.

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SOPHOMORE YEAR, FIRST SEMESTER.

Hours

Required Subjects:

<i>Chemistry</i> 57	Special Organic Chemistry	3
<i>Drawing</i> 55	Color Problems	1
<i>Home Economics</i> 7	Foods	3
<i>Physical Culture</i> 1	Physical Culture	1
<i>Zoölogy</i> 57	Physiology	3

†Elective Subjects:

	Total hours	5 or 6
<i>Botany</i> 51	General Botany	3
<i>English</i> 53	Advanced Composition and Criticism	3
<i>German</i> 3	German Prose	3
† <i>Physics</i> 51	Mechanics and Heat	2

SOPHOMORE YEAR, SECOND SEMESTER.

Required Subjects:

<i>Home Economics</i> 8	Foods	4
<i>Home Economics</i> 10	Household Art and Design	2
<i>Physical Culture</i> 2	Physical Culture	1
<i>Psychology</i> 52	Introduction to Psychology	3

†Elective Subjects:

	Total hours	7 or 8
<i>Botany</i> 52	General Botany	3
<i>English</i> 56	Argumentation	3
<i>Entomology</i> 4	Household Insects	2
<i>German</i> 4	German Prose	3
† <i>Physics</i> 52	Magnetism and Electricity	2

JUNIOR YEAR, FIRST SEMESTER.

Required Subjects:

<i>Botany</i> 55	Bacteriology	3
<i>Home Economics</i> 11	Nutrition	3
<i>Home Economics</i> 13	Home Decoration	2
<i>Physical Culture</i> 1	Physical Culture	1

†Elective Subjects:

	Total hours	7 or 8
<i>Dairying</i> 51	Domestic Dairying	3
<i>Home Economics</i> 15	Textiles	3

†Should be elected by students not offering physics for entrance.

†The student has a choice of a wide range of elective subjects from all departments of the college. Other subjects may be offered for the elective requirement.

JUNIOR YEAR, SECOND SEMESTER.

		Hours
Required Subjects:		
<i>Home Economics 12</i>	Dietetics.....	3
<i>Home Economics 16</i>	Home Nursing.....	2
<i>Physical Culture 2</i>	Physical Culture.....	1
<i>Zoölogy 58</i>	Hygiene and Sanitation.....	3
*Elective Subjects:	Total hours.....	7 or 8
<i>Home Economics 18</i>	History of Costume.....	2

SENIOR YEAR, FIRST SEMESTER.

Required Subjects:		
<i>Economics 11</i>	Economic Problems of the Home..	2
<i>Home Economics 19</i>	Home Administration.....	2
*Elective Subjects:	Total hours.....	12
<i>Dairying 51</i>	Domestic Dairying.....	3
<i>Home Economics 21</i>	Seminar.....	3
<i>Home Economics 23</i>	Teaching of Domestic Art.....	3

SENIOR YEAR, SECOND SEMESTER.

Required Subjects:		
<i>Home Economics 20</i>	Humanics.....	2
<i>Sociology 52</i>	Social Pathology and Modern Phil- anthropy.....	3
*Elective Subjects:	Total hours.....	11
<i>Home Economics 22</i>	Seminar.....	3
<i>Home Economics 24</i>	Teaching of Domestic Science.....	3

Mechanic Arts Course for Teachers.

FRESHMAN YEAR, FIRST SEMESTER.

<i>Chemistry 51</i>	Inorganic Chemistry.....	3
<i>Drawing 51</i>	Engineering Drawing.....	2
<i>Drill 1</i>	Military Drill.....	1
<i>English 51</i>	English Composition and Rhetoric.	3
<i>Mathematics 51</i>	Algebra and Trigonometry.....	4
<i>Mathematics 53</i>	Solid Geometry.....	2
<i>Military Science 1</i>	Infantry Drill Regulations.....	1
<i>Shop Work 51</i>	Wood Work.....	2

*The student has a choice of a wide range of elective subjects from all departments of the college. Other subjects may be offered for the elective requirement.

FRESHMAN YEAR, SECOND SEMESTER.

Hours

<i>Chemistry 52</i>	Inorganic Chemistry	3
<i>Drawing 58</i>	Descriptive Geometry (first half of semester)	2
<i>Drill 2</i>	Military Drill	1
<i>English 52</i>	English Composition and Rhetoric .	3
<i>Mathematics 52</i>	Analytic Geometry	4
<i>Mathematics 54</i>	Surveying (last half of semester) . .	2
<i>Military Science 2</i>	Manual of Guard Duty	1
<i>Shop Work 52</i>	Wood Work	2

SOPHOMORE YEAR, FIRST SEMESTER.

<i>Chemistry 59</i>	Introductory Qualitative Analysis .	2
<i>Drawing 61</i>	Special Drawing	1
<i>Drill 3</i>	Military Drill	1
* <i>Economics 1</i>	Elementary Economics	3
<i>English 53</i>	Advanced Composition and Literary Criticism	3
* <i>German 1</i>	Elementary German	3
<i>Military Science 3</i>	Field Service Regulations	1
<i>Physics 51</i>	Mechanics and Heat	2
<i>Shop Work 59</i>	Wood Work	2
<i>Zoölogy 51</i>	General Zoölogy	3

SOPHOMORE YEAR, SECOND SEMESTER.

<i>Drawing 62</i>	Special Drawing	2
<i>Drill 4</i>	Military Drill	1
* <i>German 2</i>	Elementary German	3
<i>Military Science 4</i>	Field Service Regulations	1
<i>Physics 52</i>	Magnetism and Electricity	2
<i>Physics 58</i>	Elementary Physics and Practice .	3
* <i>Psychology 52</i>	Introduction to Psychology	3
<i>Shop Work 60</i>	Wood Work	3
<i>Zoölogy 52</i>	General Zoölogy	3

JUNIOR YEAR, FIRST SEMESTER.

<i>Drawing 65</i>	Special Drawing	1
<i>Drill 5</i>	Military Drill	1
† <i>Economics 1</i>	Elementary Economics	3
* <i>English 55 or</i>	The English Novel	} 3
* <i>English 57</i>	Modern English Poetry	
<i>Forestry 53</i>	Dendrology	4
* <i>Geology 51</i>	Elementary Geology	3
* <i>German 3</i>	German Prose	3

*Elective.

† Required if not previously taken.

	Hours
<i>History 1</i>	European History, 476-1492..... 3
* <i>Military Science 5</i>	Field Engineering and Hasty Intrenching..... 1
<i>Political Science 3</i>	American Constitutional Law..... 3
<i>Shop Work 65</i>	Wood Work..... 3

JUNIOR YEAR, SECOND SEMESTER.

<i>Drawing 66</i>	Special Drawing..... 2
<i>Drill 6</i>	Military Drill..... 1
* <i>Economics 2</i>	Commercial Geography..... 3
* <i>Economics 4 or</i>	Money and Banking } ... 3
* <i>Economics 6</i>	Public Finance and Taxation }
* <i>Forestry 60</i>	Forest Utilization..... 3
* <i>German 4</i>	German Prose..... 3
<i>History 2</i>	European History, 1492-1715..... 3
* <i>History 6</i>	American History, 1801-1860..... 3
* <i>Military Science 6</i>	Military Map Reading and Sketching..... 1
† <i>Psychology 52</i>	Introduction to Psychology..... 3
<i>Shop Work 66</i>	Forge Work..... 3

SENIOR YEAR, FIRST SEMESTER.

<i>Drawing 71</i>	Special Drawing..... 1
<i>Electrical Engineering 9</i>	Industrial Electricity..... 3
* <i>English 55 or</i>	The English Novel } ... 3
* <i>English 57</i>	Modern English Poetry }
* <i>German 11</i>	German Composition..... 3
* <i>History 7</i>	American History since 1860..... 3
<i>Psychology 53</i>	Educational Psychology..... 3
<i>Shop Work 71</i>	Machine Work..... 2
<i>Sociology 51</i>	Primitive Man and Social Origins.. 3

SENIOR YEAR, SECOND SEMESTER.

<i>Drawing 72</i>	Special Drawing..... 2
<i>English 60</i>	American Literature..... 4
* <i>Forestry 60</i>	Forest Utilization..... 3
* <i>German 12</i>	German Composition..... 3
* <i>History 6</i>	American History, 1801-1860..... 3
<i>Mechanical Engineering 70</i>	Industrial Administration..... 3
<i>Mechanical Engineering 72</i>	Manual Training..... 1
<i>Political Science 2</i>	Laws of Business..... 3
<i>Shop Work 72</i>	Machine Work..... 3
* <i>Sociology 52</i>	Social Pathology and Modern Philanthropy..... 3

*Elective.

†Required if not previously taken.

ENGINEERING DIVISION.

Electrical and Mechanical Engineering Courses.

FRESHMAN YEAR, FIRST SEMESTER.

		Hours
<i>Chemistry 51</i>	Inorganic Chemistry.....	3
<i>Drawing 51</i>	Engineering Drawing.....	2
<i>Drawing 53</i>	Shop Mathematics (First half of semester).....	1
<i>Drill 1</i>	Military Drill.....	1
<i>Electrical Engineering 7</i>	History of Electrical Engineering	$\frac{1}{2}$
<i>English 51</i>	English Composition and Rhetoric	3
<i>Mathematics 51</i>	Algebra and Trigonometry.....	4
<i>Mechanical Engineering 51</i>	History of Mechanical Engineering.....	$\frac{1}{2}$
<i>Military Science 1</i>	Infantry Drill Regulations	1
<i>Shop Work 51</i>	Wood Work.....	2

FRESHMAN YEAR, SECOND SEMESTER.

<i>Chemistry 52</i>	Inorganic Chemistry.....	3
<i>Chemistry 54</i>	Qualitative Analysis.....	3
<i>Drawing 56</i>	Descriptive Geometry.....	3
<i>Drill 2</i>	Military Drill.....	1
<i>English 52</i>	English Composition and Rhetoric	3
<i>Mathematics 52</i>	Analytic Geometry	4
<i>Military Science 2</i>	Manual of Guard Duty.....	1

SOPHOMORE YEAR, FIRST SEMESTER.

<i>Drawing 57</i>	Machine Drawing.....	3
<i>Drill 3</i>	Military Drill.....	1
<i>Mathematics 55</i>	Calculus.....	5
<i>Military Science 3</i>	Field Service Regulations.....	1
<i>Physics 51</i>	Mechanics and Heat.....	2
<i>Physics 53</i>	Physical Theory and Practice ...	4
<i>Shop Work 57</i>	Forging.....	2

SOPHOMORE YEAR, SECOND SEMESTER.

<i>Drill 4</i>	Military Drill.....	1
<i>Machine Design 52</i>	Kinematics of Machinery.....	2
<i>Mathematics 56</i>	Calculus.....	3
<i>Mechanical Engineering 52</i>	Theoretical Mechanics.....	3
<i>Military Science 4</i>	Field Service Regulations.....	1
<i>Physics 52</i>	Magnetism and Electricity.....	2
<i>Physics 54</i>	Physical Theory and Practice....	4
<i>Shop Work 62</i>	Machine Work.....	2

JUNIOR YEAR, FIRST SEMESTER.

	Hours
<i>Drill 5</i>	Military Drill 1
<i>Electrical Engineering 1</i>	Dynamo Electric Machinery . . . 4
<i>Machine Design 53</i>	Kinematics of Machinery 2
<i>Mechanical Engineering 53</i>	Design of Machine Elements . . . 3
<i>Mechanical Engineering 55</i>	Designing and Drawing 2
<i>Mechanical Engineering 57</i>	Thermodynamics 3
<i>Mechanical Engineering 59</i>	Mechanical Laboratory 2
<i>Shop Work 63</i>	General Machine Work 2

JUNIOR YEAR, SECOND SEMESTER.

<i>Drill 6</i>	Military Drill 1
<i>Electrical Engineering 2</i>	Dynamo Electric Machinery . . . 4
<i>Machine Design 54</i>	Kinematics of Steam Machinery . 2
<i>Mechanical Engineering 54</i>	Design of Machine Elements . . . 3
<i>Mechanical Engineering 56</i>	Designing and Drawing 2
<i>Mechanical Engineering 58</i>	Thermodynamics 3
<i>Mechanical Engineering 60</i>	Mechanical Laboratory 2
<i>Shop Work 64</i>	Manufacturing 2

Electrical Engineering Course.

SENIOR YEAR, FIRST SEMESTER.

<i>Economics 1</i>	Elementary Economics 3
<i>Electrical Engineering 3</i>	Telegraph and Telephone 1
<i>Electrical Engineering 11</i>	Electrical Engineering Practice . 4
<i>Electrical Engineering 15</i>	Electrical Laboratory 3
<i>Mechanical Engineering 61</i>	Hydraulics 3
<i>Mechanical Engineering 63</i>	Materials of Engineering 2
<i>Mechanical Engineering 65</i>	Mechanical Laboratory 2

SENIOR YEAR, SECOND SEMESTER.

<i>Electrical Engineering 12</i>	Electrical Engineering Practice . 4
<i>Electrical Engineering 14</i>	Electric Railways 2
<i>Electrical Engineering 16</i>	Electrical Laboratory 3
<i>Electrical Engineering 24</i>	Design of Electrical Machinery . 2
<i>Electrical Engineering 26</i>	Illuminating Engineering 2
<i>Electrical Engineering 28</i>	Contracts and Specifications . . . 2
<i>English 56</i>	Argumentation and Debating . . . 3

Mechanical Engineering Course.

SENIOR YEAR, FIRST SEMESTER.

<i>Economics 1</i>	Elementary Economics 3
<i>Electrical Engineering 19</i>	Dynamo Electric Machinery . . . 3
<i>Mechanical Engineering 61</i>	Hydraulics 3

	Hours
<i>Mechanical Engineering 63</i>	Materials of Engineering..... 2
<i>Mechanical Engineering 65</i>	Mechanical Laboratory..... 2
<i>Mechanical Engineering 67</i>	Advanced Design..... 3
<i>Shop Work 69</i>	Advanced Shop Work..... 2

SENIOR YEAR, SECOND SEMESTER.

<i>Electrical Engineering 28</i>	Contracts and Specifications.... 2
<i>Mechanical Engineering 66</i>	Mechanical Laboratory..... 3
<i>Mechanical Engineering 68</i>	Advanced Design..... 5
<i>Mechanical Engineering 70</i>	Industrial Administration..... 3
<i>Shop Work 70</i>	Advanced Shop Work..... 2
<i>Sociology 52</i>	Social Pathology..... 3

Chemical Engineering Course.

FRESHMAN YEAR, FIRST SEMESTER.

<i>Chemistry 51</i>	Inorganic Chemistry..... 3
<i>Drawing 51</i>	Engineering Drawing..... 2
<i>Drill 1</i>	Military Drill..... 1
<i>English 51</i>	English Composition and Rhetoric 3
<i>French 1 or</i>	Elementary French }
<i>German 1</i>	Elementary German }
<i>Mathematics 51</i>	Algebra and Trigonometry 4
<i>Military Science 1</i>	Infantry Drill Regulations 1
<i>Shop Work 51 a</i>	Wood Work..... 1

FRESHMAN YEAR, SECOND SEMESTER.

<i>Chemistry 52</i>	Inorganic Chemistry..... 3
<i>Chemistry 54</i>	Qualitative Analysis..... 3
<i>Drill 2</i>	Military Drill..... 1
<i>English 52</i>	English Composition and Rhetoric 3
<i>French 2 or</i>	Elementary French }
<i>German 2</i>	Elementary German }
<i>Mathematics 52</i>	Analytical Geometry 4
<i>Military Science 2</i>	Manual of Guard Duty..... 1

SOPHOMORE YEAR, FIRST SEMESTER.

<i>Chemistry 61</i>	Qualitative Analysis..... 1½
<i>Chemistry 63</i>	Inorganic Preparations..... ½
<i>Chemistry 65</i>	Quantitative Analysis..... 4
<i>Drill 3</i>	Military Drill..... 1
<i>German 3</i>	German Prose..... 3
<i>Mathematics 55</i>	Calculus..... 5
<i>Military Science 3</i>	Field Service Regulations... .. 1
<i>Physics 51</i>	Mechanics and Heat..... 2

SOPHOMORE YEAR, SECOND SEMESTER.

	Hours
<i>Chemistry 66</i>	Quantitative Analysis..... 5
<i>Chemistry 68</i>	Organic Chemistry..... 3
<i>Drill 4</i>	Military Drill..... 1
<i>German 4</i>	German Prose..... 3
<i>Mathematics 56</i>	Calculus..... 3
<i>Military Science 4</i>	Field Service Regulations..... 1
<i>Physics 52</i>	Magnetism and Electricity..... 2

JUNIOR YEAR, FIRST SEMESTER.

<i>Chemistry 69</i>	Organic Chemistry..... 2
<i>Chemistry 71</i>	Organic Chemical Laboratory .. 3
<i>Chemistry 73</i>	Advanced Quantitative Analysis 4
<i>Chemistry 75 or</i>	Physical Chemistry } 3
<i>Chemistry 77</i>	Advanced Inorganic Chemistry }
<i>Drill 5</i>	Military Drill..... 1
<i>*Military Science 5</i>	Field Engineering and Hasty In-
	trenching..... 1
<i>Physics 55</i>	Mathematical Physics and Prac-
	tice..... 4

JUNIOR YEAR, SECOND SEMESTER.

<i>Chemistry 74</i>	Advanced Quantitative Analysis 5
<i>Chemistry 76 or</i>	Physical and Electro Chemistry } 3
<i>Chemistry 78</i> }	Industrial Chemistry }
<i>Chemistry 80</i> }	Metallurgy }
<i>Drill 6</i>	Military Drill..... 1
<i>Geology 54</i>	Mineralogy..... 2
<i>*Military Science 6</i>	Military Map Reading and
	Sketching..... 1
<i>Physics 56</i>	Mathematical Physics and Prac-
	tice..... 4
<i>Shop Work 68</i>	Machine Work..... 2

SENIOR YEAR, FIRST SEMESTER.

<i>Chemistry 75 or</i>	Physical Chemistry..... } 3
<i>Chemistry 77</i>	Advanced Inorganic Chemistry }
<i>Chemistry 79</i>	Assaying..... 1
<i>Chemistry 83</i>	Advanced Quantitative Labora-
	tory..... 6
<i>*Drill 7</i>	Military Drill..... 1
<i>Economics 1</i>	Elementary Economics..... 3
<i>*Elective.</i>	

FOUR-YEAR COURSES.

121

	Hours
<i>Electrical Engineering</i> 21	Industrial Electricity..... 3
<i>Mechanical Engineering</i> 71	Thermodynamics..... 2
* <i>Military Science</i> 7	Army Regulations..... 1

SENIOR YEAR, SECOND SEMESTER.

<i>Chemistry</i> 76 or	Physical and Electro Chemistry } 3
<i>Chemistry</i> 78 }	Industrial Chemistry }
<i>Chemistry</i> 80 }	Metallurgy }
<i>Chemistry</i> 84	Thesis..... 6
* <i>Drill</i> 8	Military Drill..... 1
<i>Electrical Engineering</i> 22	Industrial Electricity..... 3
<i>English</i> 56 or	Argumentation and Debating } 3
<i>Sociology</i> 52	Social Pathology }
<i>Machine Design</i> 56	Mechanism 3
* <i>Military Science</i> 8	Army Regulations 1

*Elective.

THE TWO-YEAR COURSE IN AGRICULTURE.

This course was established by the state legislature in 1895, and provides an opportunity to secure a training for their life work for those students who do not have the time, money or preparation to take a four-year college course.

The course is especially arranged, and suited for the young, bright boys of the farm, who expect to make a business of some line of agricultural or horticultural work. Although it is open to students who have had no previous training on the farm, the entrance of such is not encouraged because of their lack of practical experience. By independent work and close application, however, inexperienced students sometimes pass the course with credit.

The year's work closes the middle of May, so as to enable the students to get home for the spring work on the farm or to accept other positions for the summer. This short school year also permits four months' time for those students who are dependent upon their own resources to earn money for the following year.

The courses of study and the classes of the two-year course are, for the most part, separate and distinct from those of the four-year courses. The work of the first year is largely preparatory, being a study of the sciences underlying agriculture, together with some elementary agricultural and horticultural work. The second year contains optional studies so that it is possible for students to specialize in animal husbandry, dairying, horticulture or forestry. Ten hours per week on the average are spent in practical work on the farm, in the barn, greenhouses, shops or forest.

Admission.—The course is open to those who can pass a fair and reasonable examination in reading, spelling, writing, arithmetic, English grammar, geography and history of the United States. Applicants, unless over eighteen years of age, who do not bring high school or other satisfactory

certificates to show their proficiency in these subjects, will be given an entrance examination on Tuesday afternoon and Wednesday morning of the opening week of college. Applicants who are over eighteen years of age will be admitted without examination.

Expenses.—The expenses of the course will vary with the taste and frugality of the students and the kind of accommodations which they secure. The total average expense for the year, if the student holds a scholarship, is not far from \$250. Many students by working for their board or room rent, or by doing various kinds of work about the college or village, are able to go through the year with a cash outlay not exceeding \$150.

Opening.—The course for the year will open Wednesday, September 16, 1914, and close Wednesday, May 19, 1915. A Christmas vacation of two weeks, a winter vacation of one week, and a spring vacation of six days will be given.

Graduation.—No degree is given at the end of the course, but a certificate of graduation is issued upon its completion or the completion of its equivalent.

Students graduating from the two-year course in 1914 and thereafter must present to the dean on or before the second Tuesday preceding their graduation satisfactory evidence of having had practical experience in farm work, either through having lived on a farm for at least two years subsequent to the age of 12 or through having worked on a farm for at least four months subsequent to the age of 15.

Students graduating from this course in 1915 must have at least 75 credit hours.

DESCRIPTION OF STUDIES.

AGRONOMY.

PROF. TAYLOR, ASST. PROF. STOKES.

31. Farm Equipment and Soils.

Lectures on the selection, planning and equipment of a farm; fencing, drainage and farm implements. Text-book and recitations upon the formation, kinds and physical properties of soils. One afternoon per week is devoted to laboratory work. For Two-Year Students, Second Year. *Three exercises per week. 1st S.*

32. Farm Crops.

Similar to Agronomy 53. For Two-Year Students, Second Year. *Three exercises per week. 2d S.*

34. Manures and Fertilizers.

Text-book and recitations upon the constituents of farm manures and chemical fertilizers, the care and application of manures, the home-mixing of fertilizers and the modifications required by different soils and crops. For Two-Year Students, Second Year.

Two exercises per week. 2d S.

36. Farm Management.

Similar to Agronomy 55. Elective for Two-Year Students, Second Year. *Three exercises per week. 2d S.*

ANIMAL HUSBANDRY.

PROF. ECKMAN, ASST. PROF. MITCHELL, MR. JONES.

32. Types and Breeds of Live Stock.

Similar to Animal Husbandry 51. For Two-Year Students, First Year. *Four exercises per week. 2d S.*

34. Feeds and Feeding.

Similar to Animal Husbandry 54. For Two-Year Students, Second Year. *Three exercises per week. 2d S.*

35. Veterinary Science.

Similar to Animal Husbandry 55. Elective for Two-Year Students. *Three exercises per week. 1st S.*

36. Veterinary Science.

Similar to Animal Husbandry 56. Elective for Two-Year Students. *Prerequisite—Animal Husbandry 35.* *Three exercises per week. 2d S.*

37. Sheep Raising.

Similar to Animal Husbandry 59. Elective for Two-Year Students, Second Year. *Three exercises per week. 1st S.*

38. Animal Breeding.

A study of the principles and practices of animal breeding. Practice is given in tracing pedigrees. Elective for Two-Year Students, Second Year. *Two exercises per week. 2d S.*

39. Poultry.

Similar to Animal Husbandry 61. Elective for Two-Year Students. *Three exercises per week. 1st S.*

40. Poultry.

Similar to Animal Husbandry 62. Elective for Two-Year Students. *Prerequisite—Animal Husbandry 39. Three exercises per week. 2d S.*

BOTANY.

PROF. BUTLER, ASST. PROF. BLACK, MISS TEMPLETON.

31. Elements of Botany.

This course is devoted to the study of how plants grow and how plants feed. Lectures and laboratory work. For Two-Year Students, First Year. *Three exercises per week. 1st S.*

32. Fungous Diseases of Plants.

The principal fungous diseases, their cure and prevention. Lectures and laboratory work. For Two-Year Students, First Year. *Two exercises per week. 2d S.*

CHEMISTRY.

MR. HOLDEN.

32. Elementary Applications.

An elementary course, with special reference to the elements of plant food, composition of fertilizers, elements subject to exhaustion in soils, etc. For Two-Year Students, First Year.

Two exercises per week. 2d S.

DAIRYING.

PROF. RASMUSSEN, MR. WILSON, MR. PIERPONT.

31. Milk—Milk Testing.

Lectures and recitations on the composition and properties of milk, the Babcock test, the lactometer, and the inspection of milk; value and methods of keeping records of dairy cows, coöperation in dairying. For Two-Year Students, First Year. *Three exercises per week. 1st S.*

32. Market Milk.

A study of the value of milk as a food, the production and handling of market milk and of certified milk. Commercial milk inspection. Exercises will be given in the judging of milk and cream and in the scoring of dairies. Elective for Two-Year Students, Second Year.

Three exercises per week. 2d S.

33. Butter Making.

Comparative study of different systems of creaming and factors influencing the efficiency of the hand separator. A study of commercial starters, cream ripening, churning, marketing, and scoring of butter. Elective for Two-Year Students, Second Year.

Three exercises per week. 1st S.

34. Cheese Making.

Lectures and laboratory work covering the details of manufacture, curing and marketing of the more important kinds of cheese. Elective for Two-Year Students, Second Year. *Three exercises per week. 2d S.*

35. Dairy Bacteriology.

Methods of studying bacteria; relation of bacteria to milk and its products; and application of bacteriological principles to the dairy industry. Course open to a limited number of students. Elective for Two-Year Students, Second Year. *Three exercises per week. 1st S.*

DRAWING.

PROF. PUTNAM, MR. LATON.

31. Mechanical Drawing.

For Two-Year Students, Second Year. *One exercise per week. 1st S.*

ENGLISH.

MR. SCUDDER.

31. Grammar and Elementary Composition.

For Two-Year Students, First Year. *Three exercises per week. 1st S.*

32. Grammar and Composition.

For Two-Year Students, First Year.

Prerequisite—English 31.

Three exercises per week. 2d S.

ENTOMOLOGY.

PROF. O'KANE, MR. HADLEY.

32. Principles of Economic Entomology.

The relation of the structure and classification of insects to methods of insect control. The preparation and application of insecticides. Spray machinery and appliances. For Two-Year Students, First Year.

Three exercises per week. 2d S.

FORESTRY.

PROF. FOSTER.

32. Farm Forestry.

A study of the general principles of forestry with particular reference to the care and management of woodlots; the various methods of cutting and reproducing forests; artificial reforestation; nursery practice; seeding and planting; estimating standing timber; log scales; protection of forests; markets. For Two-Year Students, First Year.

Two exercises per week. 2d S

HORTICULTURE.

PROF. GOURLEY, ASST. PROF. WOLFF, MR. LUMSDEN.

31. Vegetable Gardening.

A study of the commercial methods of vegetable growing. Special attention is given to the home garden. For Two-Year Students, First Year.

Two exercises per week. 1st S.

32. Home Decoration.

A study of ornamental trees, shrubs and flowers; their culture, proper arrangement and decorative value, with special reference to the home surroundings. Elective for Two-Year Students, Second Year.

Three exercises per week. 2d S.

33. Fruit Growing.

This course embraces a study of commercial orcharding; each fruit is studied with reference to planting, cultivating, pruning, fertilizing, picking, packing, storing and marketing. For Two-Year Students, Second Year.

Three exercises per week. 1st S.

34. Orchard Problems.

A course dealing with the principal problems of farm orchards and commercial orchard management. This course is designed to show the application of the principles of fruit growing to practical conditions. Elective for Two-Year Students, Second Year.

Two exercises per week. 2d S.

35. Greenhouse Management.

Combined lecture, demonstration and laboratory course in greenhouse management. Elective for Two-Year Students, Second Year.

Three exercises per week. 1st S.

MATHEMATICS.

PROF. STECK.

31. Arithmetic.

A review of arithmetic. For Two-Year Students, First Year.

Three exercises per week, first twelve weeks. 1st S.

33. Bookkeeping.

A short course in farm bookkeeping. For Two-Year Students, First Year.

Three exercises per week, last six weeks. 1st S.

MILITARY SCIENCE AND TACTICS.

LIEUT. HUNT.

Drill.**31. Military Drill.**

For Two-Year Students, First Year. *Two exercises per week. 1st S.*

32. Military Drill.

For Two-Year Students, First Year. *Two exercises per week. 2d S.*

33. Military Drill.

For Two-Year Students, Second Year.

Two exercises per week. 1st S.

34. Military Drill.

For Two-Year Students, Second Year.

Two exercises per week. 2d S.

MILITARY SCIENCE.**31. Infantry Drill Regulations.**

Practical instruction and lectures. For Two-Year Students, First Year.

One exercise per week. 1st S.

32. Manual of Guard Duty and Small Arms Firing Regulations.

Practical instruction and lectures. For Two-Year Students, First Year.

Prerequisite—Military Science 31. One exercise per week. 2d S.

33. Field Service Regulations.

For Two-Year Students, Second Year.

Prerequisite—Military Science 32. One exercise per week. 1st S.

34. Field Service Regulations.

Lectures on advance guards, outposts, etc. Continuation of Military Science 33. For Two-Year Students, Second Year.

Prerequisite—Military Science 33. One exercise per week. 2d S.

PHYSICS.

PROF. FISHER, MR. PALMER.

31. Elementary Physics.

A study of the principles of Physics, using as centers certain important practical machines, as the steam engine, the dynamo, the electric motor, etc. For Two-Year Students, Second Year.

Four exercises per week. 1st S.

SHOP WORK.

MR. PHILBRICK, MR. CAHILL.

32. Wood Work. Mr. Philbrick.

For Two-Year Students, First Year. *Two exercises per week. 2d S.*

34. Iron Work. Mr. Cahill.

For Two-Year Students, Second Year. *One exercise per week. 2d S.*

ZOÖLOGY.

PROF. JACKSON, MR. BATCHELDER.

31. Human Physiology and Hygiene.

A study of the structure, physiology and care of the human body. Special attention will be given to the fundamental principles of Zoölogy, the nature of parasitic and bacterial diseases and the means of prevention. For Two-Year Students, First Year.

Three exercises per week. 1st S.

TWO-YEAR COURSE OF STUDY.

First Year.

FIRST SEMESTER.

	Hours
<i>Botany 31</i>	Elements of Botany..... 3
<i>Dairying 31</i>	Milk and Milk Testing..... 3
<i>Drill 31</i>	Military Drill..... 1
<i>English 31</i>	Grammar and Elementary Com- position..... 3
<i>Horticulture 31</i>	Vegetable Gardening..... 2
<i>Mathematics 31</i>	Arithmetic..... 2
<i>Mathematics 33</i>	Farm Bookkeeping..... 1
<i>Military Science 31</i>	Infantry Drill Regulations..... 1
<i>Zoölogy 31</i>	Human Physiology and Hygiene 3

SECOND SEMESTER.

<i>Animal Husbandry 32</i>	Breeds of Live Stock..... 4
<i>Botany 32</i>	Fungous Diseases of Plants..... 2
<i>Chemistry 32</i>	Elementary Applications..... 2
<i>Drill 32</i>	Military Drill..... 1
<i>English 32</i>	Grammar and Composition..... 3
<i>Entomology 32</i>	Economic Entomology..... 3
<i>Forestry 32</i>	Farm Forestry..... 2
<i>Military Science 32</i>	Manual of Guard Duty..... 1
<i>Shop Work 32</i>	Wood Work..... 2

Students who come prepared to take Freshman English may substitute English 51 for English 31.

Second Year.

FIRST SEMESTER.

<i>Agronomy 31</i>	Farm Equipment and Soils..... 3
* <i>Animal Husbandry 35</i>	Veterinary Science..... 3
* <i>Animal Husbandry 37</i>	Sheep Raising..... 3
* <i>Animal Husbandry 39</i>	Poultry..... 3
* <i>Dairying 33</i>	Butter Making..... 3
* <i>Dairying 35</i>	Dairy Bacteriology..... 3
<i>Drawing 31</i>	Mechanical Drawing..... 1
<i>Drill 33</i>	Military Drill..... 1
* <i>Forestry 53</i>	Dendrology..... 4
<i>Horticulture 33</i>	Fruit Growing..... 3
* <i>Horticulture 35</i>	Greenhouse Management..... 3
<i>Military Science 33</i>	Field Service Regulations..... 1
<i>Physics 31</i>	Elementary Physics..... 4

*Elective. Elect courses to make a total of at least 18 hours.

SECOND SEMESTER.

	Hours
<i>Agronomy</i> 32	Farm Crops 3
<i>Agronomy</i> 34	Manures and Fertilizers 2
* <i>Agronomy</i> 36	Farm Management 3
<i>Animal Husbandry</i> 34	Feeds and Feeding 3
* <i>Animal Husbandry</i> 36	Veterinary Science 3
* <i>Animal Husbandry</i> 38	Animal Breeding 2
* <i>Animal Husbandry</i> 40	Poultry 3
* <i>Dairying</i> 32	Market Milk 3
* <i>Dairying</i> 34	Cheese Making 3
<i>Drill</i> 34	Military Drill 1
* <i>Forestry</i> 54	Forest Mensuration 3
* <i>Horticulture</i> 32	Home Decoration 3
* <i>Horticulture</i> 34	Orchard Problems 2
<i>Military Science</i> 34	Field Service Regulations 1
<i>Shop Work</i> 34	Iron Work 1

* Elective. Elect courses to make a total of at least 18 hours.

THE SHORT COURSES.

The college offers the short courses for the purpose of affording an opportunity for the boys, the young men and the older men and women on the farms of our state to acquaint themselves with the latest and most approved principles and practices of agriculture. Since many of our farm people find it impossible to leave their homes during the spring, summer and fall months, these courses are given during the winter when most people can find time to slip away for at least a few weeks.

There is no longer any question concerning the value of practical scientific training for those who are engaged in farming. The increasing interest in agricultural work, the higher prices of farm products and the keener competition in all lines of production is making an education and training more and more a necessity for the people on our farms. It is hoped that these "short courses" will open an additional avenue through which the college may prove its value and usefulness to the farmers of the state.

Admission.—The short courses are open to men and women 16 years of age and upward. No entrance examination is required. To be most benefited, however, by the courses the students should be at least 18 or 20 years of age and have had some practical experience on a farm.

Expenses.—Tuition is free to residents of New Hampshire. Non-residents will pay a tuition fee of \$10 upon registering at the beginning of the course. Board and room will cost about \$5 per week. Other expenses including books need not exceed a total of \$5 although an allowance of \$10 for books alone to be taken home would be a good investment.

Prizes.—Through the courtesy of Mr. Thomas Jones Davis of Duluth, Minnesota, three suitable prizes will be given to students taking the five-week dairy course who rank highest in judging dairy cattle.

COURSE IN FRUIT GROWING AND GENERAL AGRICULTURE.

This course will open *Monday, January 4*, and close *Friday, January 29, 1915*. The subjects taught will include the following: (1) Practical Pomology, (2) Small Fruits, (3) Vegetable Growing, (4) Soil Fertility, (5) Forage and Silage Crops, (6) Woodlot Forestry, (7) Poultry.

DESCRIPTION OF STUDIES.

Horticulture 40. Practical Pomology.

This course will deal with the practical operations in the orchard, such as pruning, spraying, thinning, cultivation, and picking, packing and marketing apples. When the weather permits the class will visit the orchards and receive instruction in orchard management.

Three exercises per week.

Horticulture 41. Small Fruits.

In this course lectures and practice will be given in the propagation and culture of strawberries, raspberries, blackberries, currants, gooseberries, and grapes and the varieties suited to New Hampshire conditions.

Three exercises per week.

Horticulture 42. Vegetable Growing.

Lectures will be given on the best varieties of vegetables for home and market use, their culture and methods of preparing for market. Special attention will be given to the making and handling of cold frames and hotbeds.

Three exercises per week.

Agronomy 40. Forage and Silage Crops.

This course will consist of lectures upon forage and silage crops which are suited to New Hampshire conditions. Soiling crops, the construction of silos and the growing of crops for the silo will be treated in as much detail as the time allows. Practice in judging corn and testing seeds will be given.

Three exercises per week.

Agronomy 41. Soil Fertility.

This course will consist of lectures upon the plant food elements in the soil, the constituents of farm manures and commercial fertilizers, the care and application of manure, the home mixing of fertilizers and the formulas used for different soils and crops. Practice will be given in mixing fertilizers.

Three exercises per week.

Forestry 40. Woodlot Forestry.

Lectures upon the principles of forestry as applied to farm woodlots. The rate of growth of different kinds of timber, proper methods of cutting and marketing and of planting waste and cutover areas will be studied. Practice will be given in estimating standing timber and the use of log rules.

Three exercises per week.

Animal Husbandry 40. Poultry.

Lectures and laboratory work on the breeds of poultry, feeding, fattening, killing and dressing, marketing, poultry house construction, incubation, brooding and the common diseases of poultry.

Three exercises per week.

FARMERS' WEEK COURSE.

This course was first offered by the college in the spring of 1909, with a total enrollment of 80. In 1910 the enrollment was 199; in 1911 it was 238; in 1912 it was 273; in 1913 it was 331, and in 1914 it was 352.

The course is designed to meet the needs of the every-day practical farmer and his wife who cannot leave home for more than a few days, but who wish to get some new ideas concerning the newest and best methods of farming operations and household work.

This course will begin *Monday, February 1*, and close *Friday, February 5, 1915*. A special program will be issued later, copy of which will be sent upon request.

COURSE IN DAIRYING.

The Twentieth Annual Course in Dairying at the college will open *Tuesday, February 9*, and close *Friday, March 12, 1915*. Students should present themselves for registration

at Thompson Hall on the opening day. Lectures and laboratory work will begin the following day.

Instruction in Dairy Practice.—Instruction in the Dairy course is given by lectures, recitations and by laboratory work in the barn, dairy and creamery. The course is made as practical as possible, and the instruction is planned to meet the needs of two classes of students, namely, *butter makers*, and *dairymen* and *milk producers*.

Butter makers.—The work in the laboratory and classroom is conducted with a view to training men to be expert operators of skimming stations, creameries, and private dairies. Throughout the entire course students will be given practical work in the college creamery or dairy.

Dairymen and Milk Producers.—To make dairying in New Hampshire profitable, the dairyman must fully understand the handling of cows and their product. The course as outlined, treating of the feeding and breeding of cattle and the handling and marketing of dairy products especially suits the need of the dairy farmer. From time to time lectures will be given by successful and practical men directly engaged in agriculture. Excursions will be taken to up-to-date dairy farms and other dairy establishments.

The equipment in the dairy building is such that the laboratory work can be made applicable both to farm and factory conditions. The student will have an opportunity to study construction and efficiency, and operation of the various machines used in handling milk and making butter. The use of the Babcock test in apportioning the money value of milk is regulated by state law. The importance of the test in the successful improvement of the dairy herd is becoming more and more apparent. The details of the test will be studied, and the student will practice testing milk, cream, skim-milk and buttermilk until fully competent to perform the work for himself or for others.

Opportunities.—The need of competent trained dairymen is greater than ever before. There is an increasing

demand for first-class dairy products, such as butter, cheese, and condensed milk, and the making of these calls for first-class dairymen. The continuous campaign for pure milk in our cities is constantly opening up new positions for milk inspectors, and for men with training who can successfully manage dairy farms and care for the herd so as to produce sanitary milk economically. It also opens positions for men who are capable of operating milk depots and other dairy establishments. The organization of cow-test associations is opening up a new field for dairy workers. Although the school does not guarantee to find positions for those registered in the course it has opportunities to recommend students for a large number of positions. Inquiries for competent men are received throughout the year and thus far the college has been unable to supply men for all the places it has been asked to fill.

Certificates.—Students completing the required work of the Dairy Course, and passing satisfactory examinations, will be given certificates.

Equipment.—The New Hampshire College with its new dairy building offers excellent opportunities for giving instruction in practical dairy work.

Entirely new equipment has been installed in the college creamery, each piece of machinery being run by an individual electric motor. In addition to the milk obtained from the college herd, the creamery receives milk and cream from about forty farms. By this arrangement sufficient milk for practical work is furnished at all times. The farm dairy is equipped with the leading kinds of hand separators, and hand as well as small-power churns suitable for private dairies. The milk-testing and milk inspection laboratory is equipped with Babcock testers, sediment testers, acidimeters, and other apparatus necessary for inspection of milk and cream both as to fat content and other qualities. The creamery also contains bacteriology laboratories, a lecture room, offices, a reading room and rooms for an up-to-date milk bottling plant.

Representative animals of the Jersey, Guernsey, Ayrshire and Holstein breeds are owned by the college and are used to acquaint the student with the different breeds and types of dairy cattle.

DESCRIPTION OF STUDIES.

DAIRY PRODUCTS.

PROF. RASMUSSEN, MR. WILSON, MR. PIERPONT.

Dairying 40. Butter Making.

Lectures and recitations on the different systems of creaming milk and a comparison of the efficiency of different cream separators under varying conditions; cream ripening; churning, washing, marketing and scoring of butter. *One lecture and two laboratory periods per week.*

Dairying 41. Dairy Bacteriology.

Lectures and demonstrations on the functions of bacteria and the application of bacteriological principles to dairy work, such as pasteurization, cream ripening, commercial starters and deterioration of butter. *Two exercises per week.*

Dairying 42. Market Milk.

A study of the value of milk as a food and its relation to public health. The production and handling of market milk, of certified milk. Commercial milk inspection. Exercises will be given in the scoring of milk and cream, and in the scoring of dairies. *Two lectures and one laboratory period per week.*

Dairying 43. Milk Testing.

This course will consist of a study of the composition, the physical and chemical properties of milk, the various methods of sampling and testing milk and cream, the testing of dairy herds and organizing and operating cow-test associations. *One lecture and two laboratory periods per week.*

DAIRY CATTLE.

PROF. ECKMAN, ASST. PROF. MITCHELL.

Animal Husbandry 42. Breeds and Breeding.

Lectures and recitations upon the origin, history, characteristics, and adaptability of the breeds of dairy cattle. The practical work will con-

sist of scoring and judging the various breeds, and in tracing pedigrees of animals in the herd books.

Two lectures and one judging period per week.

Animal Husbandry 44. Diseases of Cattle.

This course will consist of lectures and recitations upon the anatomy and physiology of the cow, with special reference to the digestive, reproductive and milk-producing organs. The common diseases, their causes and the methods of treatment will be discussed.

Three exercises per week.

Animal Husbandry 45. Feeds and Feeding

Lectures and recitations upon the composition and digestibility of feeding stuffs. A detailed study of the different grains and feeds, and their value in a dairy ration. Practice will be given in computing and mixing rations for the dairy cow, and in fitting animals for the show ring.

Three exercises per week.

NEW HAMPSHIRE AGRICULTURAL EXPERIMENT STATION.

Most of the agricultural experiment stations of the various states, including that of New Hampshire, were founded in 1888 by an act of congress, approved March 2, 1887, known as the Hatch Act, in honor of its author. This act appropriated fifteen thousand dollars (\$15,000) annually for the maintenance of an agricultural experiment station in each state. This act provides:

"That it shall be the object and duty of said experiment stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject with the remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and water; the chemical composition of manures, natural and artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses and forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable, having due regard to the varying conditions and needs of the respective states and territories." The act also provides that the results of such work shall be published in bulletins and reports.

A further endowment of the experiment stations to provide specifically for research work was made by the Adams Act, passed by congress and approved March 16, 1906,

which provided an increased annual appropriation which now amounts to \$15,000 each year. This appropriation is specifically limited to the "necessary expenses of conducting original researches or experiments," and the rulings of the United States Department of Agriculture, which is vested with the supervision of the expenditures under this act, require that this appropriation be spent in fundamental investigations or researches to determine the underlying causes and principles of agricultural science, rather than for mere experiments to secure results of immediate practical application as contemplated under the Hatch Act appropriation. The purposes of the two acts are, therefore, supplementary but distinct.

The New Hampshire Agricultural Experiment Station is organized as a department of the New Hampshire College of Agriculture and the Mechanic Arts, and is administered by a board of control, elected by its board of trustees.

The publications of the station comprise 168 bulletins of the regular series and 14 circulars, 6 technical bulletins, and 7 scientific contributions, and 4 school bulletins. The bulletins are issued at irregular intervals and are sent to all residents of New Hampshire requesting them. Back numbers will be sent as long as the supply lasts. Lists of available publications will be sent upon request.

The above quotations taken from the Hatch and Adams acts are sufficient to indicate the true function of this and other experiment stations called into being by the passage of those laws. At first the experiment stations found it difficult to resist the popular demand made upon them to enter the extension field, to the neglect of research, but it is to the credit of those officials having the directing and executing of those laws in charge that our stations have proved true to their trust. If our stations had not devoted their energies to the fields of original research our agriculture now could not possibly be upon the high plane which it is today.

The introduction of the extension service as a recognized part of the work of this and other similar institutions only

serves to emphasize the importance of experiment station work. In our haste to produce immediate results we sometimes lose sight of the value of the work of our experiment stations. We do not realize the debt agriculture owes to the scientists who are willing to devote their life work to the study of one subject, or at least a very few subjects, without thought to personal ambition and advancement, but purely seeking after truth and the advancement of science.

We can, perhaps, best indicate in a brief way the present work of the New Hampshire Experiment Station by calling attention to those projects which are receiving special study and attention.

HATCH FUND.

Agronomy Department.—Variety tests of corn; ear row test of corn; fertilizer tests on grass lands; alfalfa improvement; clover plant selection; pasture improvement; timothy selection and breeding; investigations on potato culture.

Botany Department.—Effect of storage on keeping qualities of potatoes; apple diseases.

Animal Husbandry Department.—Sheep feeding; eradication of the stomach worm (*Haemonchus contortus*) and intestinal worms.

Entomological Department.—Control of black flies and midges; economic collection of insects.

Horticultural Department.—Variety tests of plums; variety tests of apples; variety tests of small fruits.

Chemical Department.—Effect of lime on New Hampshire soils.

ADAMS FUND

Agronomy Department.—Water as a limiting factor in the production of corn.

Botanical Department.—A study of the toxic action of fungicides to parasitic fungi; physiology of the apple; a study of the effect of fungicides and insecticides on plants.

Chemical Department.—Potash in clay soils.

Entomological Department.—The apple maggot; control of root maggots by insecticides.

Horticultural Department.—Plant breeding: carnation breeding, squash breeding; fruit bud formation.

Animal Husbandry Department.—Sheep breeding.

The New Hampshire Experiment Station is glad at all times to give advice and assistance regarding all lines of agriculture and we invite you to make demands upon the station whenever you feel that this institution can be of assistance to you in any capacity. The experiment station is at the service of the citizens of New Hampshire at all times.

EXTENSION SERVICE.

The last few years have witnessed in this country a remarkable growth in the development of methods of teaching agriculture. The attitude of the public in general, as well as the rural population, toward technical agricultural training has become decidedly favorable. This change in feeling by the public toward the work of institutions offering training in agriculture has made possible and is responsible to a large extent for the unprecedented progress which has been made in agricultural teaching during the last dozen or fifteen years.

That form of agricultural teaching known as extension work is one of the most recent to be inaugurated. Some

form of organization for conducting agricultural extension work has been instituted at forty-three of our state agricultural colleges and universities. The scope of the extension service has been very rapidly extended until in some of our larger institutions it embodies some form of extension activity to correspond with the instruction given in each of the agricultural departments as well as in the divisions or departments of home economics.

No former attempt along agricultural educational lines has met with such a quick response from all classes of people. The results to be derived from the proper presentation of extension work were quickly recognized as being of the greatest importance to agricultural progress. Consequently large appropriations have been granted in many states for extension activities and the development of extension work which has followed has not only been rapid but extensive and the results obtained have been such as to fully justify all efforts and expenditures.

The extension service is intended to serve as a medium by which to take the work of both the college classroom and the experiment station fields and laboratories directly to the homes and to the fields of the farmers. It is very difficult to place any just estimate upon the value of such service to a state or to the nation. The farmer's cause is no longer considered of interest only to him. It is recognized today as never before that upon the prosperity of the farmer depends quite largely the general prosperity of all classes of people. The present high cost of living has done much to attract the attention of people to the relation which the farmer and his interests bear to them personally.

What the colleges and universities are to those young men and young women who come within their walls, the extension service is, only to a lesser degree, to the thousands who are beyond the reach of the classroom. In this state, for example, we have about 400 students enrolled at New Hampshire College, while there is a rural population in the state of nearly two hundred thousand, many of whom it is

possible to reach in some tangible and helpful way through the extension service.

Extension work at New Hampshire College may be said to have had its real beginning September 1, 1911, when the first money appropriated by the state for such a purpose became available for taking up extension work in a systematic manner. The appropriation was small, amounting to only \$2,500 a year. The amount of money appropriated was so small that none of it was used for salaries. Consequently it was necessary to depend entirely upon the regular members of the college and station staff to conduct the extension work. In almost every instance it meant additional duties being thrust upon those already carrying full schedules of teaching and station responsibilities.

It may be of interest to note some of the things it has been possible to accomplish under the above named conditions and what the work should mean to the industrial interests of the state.

Letters of Inquiry.—One very noticeable and striking result of extension activities and the popularity of such work is the increasing number of letters of inquiry which have been received and answered by the members of the college and station staff. This would seem to indicate that as the institution and its various activities become better known they become more highly appreciated by the citizens of the state. It is very difficult to place a true value upon the benefit that may be derived through the answering of letters of inquiry. When a person sits down and writes a letter to the station, he by that act shows that he is interested and information given will generally be put to good service.

Field Demonstrations.—Some of the most effective forms of extension service are those connected with practical demonstrations in the field conducted in different sections of the state in coöperation with farmers. Seeing is believing, and when demonstrations are made in neigh-

borhoods under conditions all of which are familiar in that vicinity, such demonstrations carry with them a prestige which they could not possibly have in those communities where the work carried on in any other localities. Realizing the importance of demonstrations, not only to farmers, but to the college and station workers as well; the demonstration forms of extension work have received special attention.

Variety Tests of Corn.—While there does not exist today the same interest in growing corn for grain in New Hampshire as formerly, owing to the practice of growing more of the corn for the silo and the fact that the acreage devoted to the growing of corn has decreased very rapidly, amounting to nearly one-half during the thirty years ending 1909; yet in spite of this apparent loss of prestige as a farm crop in New Hampshire, corn still ranks third in importance when judged by its value. It is exceeded in value by only two crops, hay and forage, and the potato crop.

The corn situation in this state is a peculiar one; there do not seem to be any recognized strains of corn that are considered as being superior for growing in certain sections or over the state as a whole, as is the case in most states. Seed corn is generally selected in the immediate neighborhood. While this practice is commendable and is good husbandry, it does not necessarily follow that the seed now being grown is the best seed that might be obtained for that locality and under existing conditions. There has been little opportunity of determining this point by comparison. Two years ago a canvass was made of the state in an attempt to secure samples of the best seed corn being grown. Arrangements were made with five county farms and the State School for Feeble Minded at Laconia to test these most promising samples of seed corn side by side under the same conditions in the different parts of the state. It was hoped in this way to secure some of the most promising varieties of corn that could be grown in those sections and over the state as a whole. Plans are made to still further

improve these superior seeds through careful selection and breeding. It is possible for this institution to render the state a most valuable service through the dissemination of improved seeds. This work at similar institutions in other states has been a most potent factor in improving agriculture by increasing the yields and quality of crops grown and hence the farmers' net returns.

An average increase in yield of corn of only three bushels per acre in New Hampshire, at average prices, would amount to over \$44,000 a year. In many instances it is possible to double the present yield of corn. In some parts of the state much can be done in the way of encouraging the growing of improved early maturing varieties of corn. At prevailing prices corn can be grown in this state at a profit. The last census shows, in value per acre, corn to be the most valuable cereal crop grown in the state.

Top Dressing Hay Lands.—A question frequently asked the station is whether it is practicable to try and keep up hay yields by top dressing grass lands with fertilizers, and if so, what chemicals or fertilizers would be the best to use for the purpose. The experiment station has a long-time test under way to secure some definite figures on the value of continuous top dressing of grass lands with different chemicals. Thirty plots are included in the test. The work has been under way seven years. In order to secure supplemental data on different types of soils coöperative tests are being conducted on county farms and on other farms located in different parts of the state.

Value of Lime on New Hampshire Soils.—Within the last few years much publicity has been given to the value of lime for agricultural purposes. Many lime and marl companies through their advertisements have made extravagant claims as to the value of their products. These claims for use of lime on the farm have naturally prompted many to write to the station for information on this subject. Results obtained by the experiment station on the college

farm differed from those obtained in many states and did not show the value claimed for lime by many of its friends. Not wishing to confine our investigations on lime to the type of soil and crops grown on the college farm, arrangements were made with some twenty-eight farmers located in different parts of the state to conduct coöperative tests of the value of lime. While the past three seasons have been so dry that it has not been the most favorable for carrying out a test with lime, and the work is not ready to be reported upon in definite form, apparently our soils do not require or make as good use of lime as the soils in some parts of the country.

Lime undoubtedly has a place in New Hampshire agriculture; it would seem, however, in view of tests completed to date, that it does not have so important a position as is sometimes attributed to it. In view of the prevailing prices asked for lime it would seem that economical use in this state should be restricted to use with certain crops and on soils known to be acid.

Orchard Sod Mulch.—A much discussed and very important subject of orchard management is the value of sod mulch as compared with clean culture. This is a subject of special interest in this state where there is such large acreage of good orchard lands which can be easily tilled. Sod mulch versus clean cultivation, both with and without fertilizers, is under test in a bearing orchard and a young orchard that has just been set out.

Spraying Demonstrations.—A subject of vital concern to all orchardists is that of when and how to spray and what to use for best results without injuring the fruit or foliage with spray materials. Aside from the tests made in the college orchards, coöperative spraying tests were made this year in some of the large commercial orchards of the state. Data and observations obtained in this way regarding spray materials under known conditions, while in

no way conclusive, should prove helpful to the orchardists of the state.

Orchard Cover Crops.—Another very important question of orchard improvement is being tested out through the extension service, and that is the most suitable cover crops to plant in cultivated orchards. Quite a number of crops and combinations of cover crops are now under trial and observation.

Orcharding is receiving more attention and study each year in New Hampshire and is proving to be worthy of the very best care and management. By natural endowment our soils and climate are well suited to fruit growing. New Hampshire fruit possesses excellent flavor, good keeping qualities, and is capable of commanding the best prices in our home and foreign markets. The appearance of thrifty seedling apple trees growing along our road-ways and scattered through our pastures is evidence of the adaptability of this section for growing fruit trees. The New Hampshire farmer is giving closer study to orcharding than ever before. Orchards are better pruned and sprayed and kept in better condition in every way than formerly. This increased activity along orchard lines has increased the demands made upon the college and station for both information and assistance in orchard management. As many of our orchards are brought under cultivation questions naturally arise regarding intercropping and catch crops best suited to orchards, and many other timely important problems are presented for solution and advice. As rapidly as means permit tests are being made of these pressing orchard problems, not only at the station but in coöperation with commercial fruit growers in different localities.

Pruning and Spraying.—A line of orchard demonstration that seems to have met with favor during the past season is the orchard pruning and spraying demonstrations. These are held early in the spring in some centrally located orchards in localities where such instructions are requested.

Last spring fifteen of these demonstrations were given. They were well attended and apparently created much interest and were the means of spreading much valuable information in an effective way. The pruning and spraying is done out in the orchard in the presence of the farmers and under conditions that encourage free discussions and exchange of ideas. Nearly 1,200 people were in attendance at the orchard demonstrations held last year.

Dairy Extension Activities.—Dairy farming is regarded as being one of the most important lines of farming in New Hampshire. This is as it should be. Excellent markets are near at hand and the very nature of our land commends it to the keeping of live stock. Only 28.6 per cent. of the farm land is improved or tillage land, which goes to show that we must have large areas of broken rough land that should be available for pastures. A great deal of our farm land needs and will respond readily to applications of stable manure. Hence the extension service of the college is giving special attention to the subject of dairying, and is doing everything within its means to assist the New Hampshire farmer to realize a larger return for labor expended and money invested.

Dairy Cow-Test Associations.—Four dairy cow-test associations have been organized and are being conducted successfully. These test associations are important factors in bringing out the facts relating to the dairy business. Through these associations are gathered the facts and information which are fundamental to dairy progress. It is safe to say that at least one third of the cows in New Hampshire are being kept at a loss. These animals, while requiring practically as much food and labor to care for them as the profitable type of cows, not only do not bring in a profit themselves, but cut down the net returns which the farmer would otherwise receive from his herd.

But the work of these associations by no means stops here. The question of the proper and economical feeding

of a dairy herd is of equal importance. It is not only necessary to have an animal of capacity, but she must be fed economically. The New Hampshire farmer could well afford to raise much more of the grain fed to his stock than he is producing at the present time, and that is particularly true of the protein part, the most expensive part, of the feed given his herd. These associations frequently take up the coöperative buying of grain upon which marked savings can be made, and also the coöperative selling of dairy products.

Breeding Associations.—The extension service has also been identified with the organizing of two Holstein breeders associations. These associations are doing excellent work. They are not confining their efforts to the Holstein breed of cattle, but their influence extends to all classes of live stock. These coöperative associations are pointing the way to greater and better things agriculturally in our state.

Agricultural Reading Courses.—Agricultural reading courses have been offered in eight agricultural subjects and one in home economics. These courses have proved quite successful, about 300 having enrolled for the work. Owing to a lack of funds and assistants who could devote their time to this work, we have not attempted to prepare all of the lessons in these reading courses. We have adopted as a text-book those works that seemed to cover the subject in a most thorough, simple, and comprehensive way. We ask those who take up the courses to purchase this book. There is no other expense connected with taking up any of these courses. We recommend some reference books so that those who desire to do so can add them to their library; or where clubs are organized these books may be exchanged among the members of the club. In addition to the above, lists of state experiment station publications, farmers' bulletins, and other publications dealing with different phases of the courses are submitted for reference and study.

Some of the granges have conducted agricultural reading clubs as a part of their regular grange work and the courses have proved quite successful when carried on in that way.

A new use has recently developed for these reading courses which will undoubtedly prove to be the most effective of any that have been tried to date. We have an agricultural adviser in Sullivan county who is acting under the joint direction of the County Agricultural Association, the Bureau of Plant Industry, Washington, D. C., and the college. This agricultural adviser has organized local clubs where they are taking up these agricultural reading courses. The clubs hold meetings once in two weeks under the leadership of the county agricultural adviser. At these meetings are discussed the work studied and the relation of the subjects studied to their own farm operations. These meetings encourage a free discussion of all phases of the reading courses and tend to make the courses more interesting and helpful. This same plan is being followed where men are located in different counties carrying out the farm demonstration work which will be described a little later.

Special Days at the College.—We held at the college last year a Poultry day, an Orchard day, and a Dairy day. All of these meetings were well attended and much interest was manifested in the exercises.

Farmers' Picnic and Educational Meeting.—A farmers' picnic and educational meeting was held a year ago at the college as a part of the extension service, which was attended by about 2,000.

There was held on October 30, 1913, an Orchard day. Nearly 300 were in attendance, and about 300 plates of apples were sent in for the fruit exhibit aside from boxes, barrels, and the college fruit display.

All members of the college and station staff are sent out frequently to lecture and act as judges at grange meetings, to address boards of trade, and other gatherings. In this

way a great many people are reached during the course of the year in a direct, personal manner.

Extension Publications.—An important and far reaching line of the extension service activities has been the publishing of bulletins and circulars containing farm information for the average farmer. The regular station series of bulletins do not always meet the requirements of the farmer with respect to telling him how to do things. The experiment station is supported by federal funds which can be used only for the reporting of the results of research and cannot be used for publishing general information bulletins such as the farmer prefers to receive. We have published thirty-eight extension press bulletins during the past two years which have dealt with timely topics and supplied detailed information at the time when such information was desired by the farmer. Aside from sending these bulletins to the newspapers, they are sent to a mailing list of 11,000 in the state. Eleven extension circulars have also been issued. They have been very well received by those for whom the publications were prepared and we know from the many appreciative letters that have been received that these publications are accomplishing a lot of good and meeting an urgent demand. Two extension bulletins have been published—one on orcharding, and one on dairying, two of the important branches of New Hampshire agriculture. We have in preparation at the present time a number of publications which should be of special interest to the farmers of the state.

Farm Demonstrations.—This year there has been started some farm demonstration work in different parts of the state in coöperation with farmers which we believe will prove to be the most important step that has been taken in this state to advance agricultural education and its practical application. There is no more effective way of teaching approved agricultural practices than by demonstrating how the work should be done right out on the farm at dif-

ferent points in the state under conditions that are familiar to the farmers of that section. Seeing is believing and this is especially true of our farm work. The successful growing of a crop of corn, potatoes, hay or any other farm crop has an increased educational value if the work is carried out under conditions that are known and familiar to the people whom it is desired to reach. These facts have been too thoroughly demonstrated to make it necessary to cite examples.

Working on the theory that the practical demonstration of the subject on the farm is the most successful way of disseminating agricultural information, four farm demonstrators have been employed.

Orchard Demonstrations.—An orchard demonstrator is located in Hillsborough county, one of the best orchard counties of the state. He will devote his entire time to the study of the local orchard conditions and in carrying on definite forms of orchard demonstration work with some of the orchardists of the county.

Dairy Farm Demonstrations.—A man is located in Grafton county who is giving the dairy farm problems that need solution in that part of the state careful study. After having made a preliminary survey of the dairy conditions in the county and assisting in starting three cow-test associations, he is now taking up some definite lines of dairy farm demonstration work with twenty-six dairy farmers. These farmers own in the neighborhood of 900 cows. Careful records are being kept of all these animals by the farmers themselves, which is going a step farther than in the cow-test association work, where the farmers hire some one to make the records for them.

Boys' and Girls' Clubs.—Another man is organizing boys' and girls' club work in four of the counties in the southern part of the state. At first the work will be conducted with boys. The crops selected for the club work

will be corn and potatoes. We have selected these crops for club work because we want the boys to work with some of the every-day farm crops in order that they may learn that these crops can be grown at a profit, and that farming may be made a profitable business; that agriculture is an occupation worthy of their best efforts.

In other parts of the country the boys' club work has served another useful purpose; many times the parents have been reached through the boys' club work when they could not be approached in any other way. If a boy grows a larger yield of corn or one of better quality (the same would be true of any other crop), his parents are sure to be interested in his accomplishments and how they were brought about. If the method employed by the boy is a practicable and economical one, the boy's father is pretty sure to employ the same methods in growing his corn crop. This influence extends farther even than this. If the boy's father is likewise successful in growing a crop of corn that is superior to the ones grown in that locality, it is pretty sure to attract the attention of his neighbors, and they will look to him for seed and instructions as to how he was able to obtain such results. In this way the influence extends in an ever-widening circle and has in some states, where the work has been under way for a few years, practically revolutionized the growing of certain crops, especially corn, wheat, and cotton.

Soil Fertility and Crop Rotation.—Another man has been employed to work out some successful system of bringing back into a state of profitable production those neglected fields of which there are entirely too many in our state. Even though the tillage area of New Hampshire is small, making up less than 17 per cent. of the acreage of the state, it is quite a common practice among our small farmers, who have only a few head of live stock, to leave these fields sown down to grass for entirely too long a time, until they have become unproductive and bring in a very small revenue. It is possible to keep these fields in a high state of fertility

and hence they will be capable of producing better crops which can be grown more economically. It is to demonstrate some of these things that the soil fertility and crop rotation farm demonstration man will devote his efforts. This is, undoubtedly, one of the greatest problems that confronts the New Hampshire farmer today. It is fundamental to all other forms of farming; sooner or later we must come back to reckon with the problem of soil fertility. We cannot depend entirely upon the keeping of live stock to meet this demand, or at least it is not being done at the present time, and something else must be substituted in its place. We must give more attention and study to profitable systems of crop rotation and the kinds of crops that are grown in order to maintain and increase soil fertility, if we would even approach the possibilities of our New Hampshire soils, and it is hoped, through this farm demonstration work, not only to point out but to prove through demonstration the practicability of keeping these soils in an active state of profitable production. This soil fertility and crop rotation demonstration work will be carried on in coöperation with farmers in Rockingham and Strafford counties.

In spite of the progress which has already been made in developing the Extension Service of New Hampshire College it can be safely said that the work is only in its beginning. It is sure to be recognized and appreciated as one of the most important agencies at work in this state in the dissemination of practical, usable, and much-needed information toward the building up of a more prosperous agriculture, and hence a more contented, happy, and prosperous people.

DEGREES CONFERRED IN 1913.

MASTER OF SCIENCE.

Charles Farnum Whittemore, B.S. 1911.

ELECTRICAL ENGINEER.

Merton Maine Cory, B.S. 1908.

BACHELORS OF SCIENCE.

Agriculture.

Batchelder, Roy Eugene.	Joslyn, Clyde Frederic.
Eastman, Moses Gale.	Kelley, Charles George.
Falconer, William Marshall.	Knight, Ray Hubert.
Foster, Perley Addison.	Ladd, John Everett.
Garland, Irving Robinson.	Whiting, Paul Nathaniel.

Arts and Science.

Adams, Carroll Sidney.	Jones, Philip Cowell.
Andrew, David Henry, Jr.	Leavitt, Van Earle.
Batchelder, Charles Howard.	Locke, Harriet Esther.
Bradford, Maurice Palmer.	Lord, Mabel Estelle.
Eastman, Wesley Edward.	McPheters, George Allen.
Gillespie, Marion Emma.	O'Connor, Regina.
Hamel, Vivian Blanche.	Rogers, Charles Harold.
Hayden, Harry Eugene.	Sanborn, Ralph Moses.
Hodgdon, Winifred.	Sanborn, Smith.
Jenness, Augustine Watson.	Scott, Charles Field.
Jenness, Chester Albert.	Willard, Daniel Phineas Alston.

Chemical Engineering.

Keyes, Donald Babcock.	Morgan, John Christie.
Lane, Gilbert Frederic.	Robinson, Harold Averill.
Twomey, Thomas James.	

Electrical Engineering.

Barrett, Lawrence Newton.	Lang, Gilman Anjavine.
Beach, Robin.	Paine, Nathan Deane.
Davis, Wesley Elton.	Richmond, Alfred Leroy.
Hilliard, Leon Wilcomb.	Tubman, Perry Elliot.

Mechanical Engineering.

Gale, Philroy Clifton.	Work, Clayton Wight.
Peavey, Harold Forrest.	Yates, James Black.

Unclassified.

Williams, Everett Cook.

Two-Year Certificates.

Barton, Charles Andrew.
 Batchelder, Harry Conrad.
 Bean, Benjamin Bickford.
 Beaven, Clarence Theodore.
 Blodget, Chester Buck.
 Bodwell, Jonathan Moore.
 Chase, Philip Leroy.
 Cole, Warren Asa.
 Converse, Carl Rondo.
 Graham, Clifford Loyd.

Hardy, Charles Richardson.
 Huse, Gordon Bancroft.
 Pascoe, William Henry.
 Richardson, Ellsworth Albie.
 Robie, Albion Everett.
 Robinson, William Henry.
 Rutter, Everett Rogers.
 Sawyer, Roscoe Alfred.
 Smith, Albert Eaton.
 Wear, Frank Gordon.

 HONOR LIST FOR 1913.

SPECIAL HONOR.

Average of 90 for the year's work.

1913.

Moses Gale Eastman,
 Marion Emma Gillespie,
 Winifred Hodgdon,
 Donald Babcock Keyes,

Agricultural Course.
 Arts and Science Course.
 Arts and Science Course.
 Chemical Emgineering Course.

1914.

Frances Augusta Nudd,

Arts and Science Course.

1915.

Leland Whitney Crafts,
 Marion Edgerly Nash,
 Helen Waldron Plumer,

Arts and Science Course.
 Arts and Science Course.
 Arts and Science Course.

HONOR.

Average of 80 for the year's work.

1913.

David Henry Andrew, Jr.,
 Charles Howard Batchelder,
 Robin Beach,
 Wesley Elton Davis,
 Wesley Edward Eastman,
 William Marshall Falconer,
 Harry Eugene Hayden,

Arts and Science Course.
 Arts and Science Course.
 Electrical Engineering Course.
 Electrical Engineering Course.
 Arts and Science Course.
 Agricultural Course.
 Arts and Science Course.

Ray Hubert Knight,
 Gilman Anjavine Lang,
 John Christie Morgan,
 Harold Averill Robinson,
 Charles Harold Rogers,
 Ralph Moses Sanborn,
 Thomas James Twomey,
 Daniel Phineas Alston Willard,

Agricultural Course.
 Electrical Engineering Course.
 Chemical Engineering Course.
 Chemical Engineering Course.
 Arts and Science Course.
 Arts and Science Course.
 Chemical Engineering Course.
 Arts and Science Course.

1914.

Percival Moulton Blake,
 Ray Warren Combs,
 Leroy Dexter Jesseman,
 Lloyd Stephen Riford,
 John Walter Taylor,
 Wallace Whittier Wilder,

Arts and Science Course.
 Agricultural Course.
 Agricultural Course.
 Agricultural Course.
 Arts and Science Course.
 Agricultural Course.

1915.

Mario James Broggini,
 Paul Edward Corriveau,
 Charles Wesley Davis,
 Raymond Edson Dearth,
 Albert William Gamash,
 John Ingraham Garside,
 John Leo Grady,
 Alice Joanna Hoitt,
 Anna Morse Hopkins,
 Roland Hugh Kinder,
 Esther Gladys McKone,
 Earl Roger Montgomery,
 Irving Chellis Story,
 Walter Whittier Swett,
 Lena Vernice Waldron,
 Pitt Sawyer Willand,

Chemical Engineering Course.
 Agricultural Course.
 Chemical Engineering Course.
 Agricultural Course.
 Agricultural Course.
 Engineering Course.
 Engineering Course.
 Arts and Science Course.
 Arts and Science Course.
 Arts and Science Course.
 Arts and Science Course.
 Arts and Science Course.
 Arts and Science Course.
 Arts and Science Course.
 Agricultural Course.
 Arts and Science Course.
 Chemical Engineering Course.

1916.

George Wilbur Burke,
 Earle Joseph Carleton,
 Genevieve Adrienne Jeannette Charbon-
 neau,
 Dura Prescott Crockett,
 Ralph Waldo Doeg,
 Marion Grace Dudley,
 Edward Deering Fuller,
 Leon Abbott Hawkins,
 Wesley Everett Howard, Jr.,
 Stephen Guy Johnson,
 Marion Edwena Mitchell,

Chemical Engineering Course.
 Chemical Engineering Course.
 Arts and Science Course.
 Agricultural Course.
 Engineering Course.
 Arts and Science Course.
 Chemical Engineering Course.
 Agricultural Course.
 Agricultural Course.
 Agricultural Course.
 Agricultural Course.
 Arts and Science Course.

William Remick Partington,	Engineering Course.
Philip Pennell,	Chemical Engineering Course.
Vincent Aubert Perkins,	Agricultural Course.
Neil Abner Sargent,	Chemical Engineering Course.
Walter Ira Waite,	Chemical Engineering Course.

PRIZE RECORD FOR 1913.

BAILEY PRIZE—\$10.

GIVEN BY DR. C. H. BAILEY, CLASS OF '79, AND E. A. BAILEY, CLASS OF '85.

DONALD B. KEYES, Durham.

ERSKINE MASON MEMORIAL PRIZE

WINIFRED HODGDON, Portsmouth.

CHASE-DAVIS MEMORIAL MEDALS.

Gold Medal.

PHILIP C. JONES, Milton.

Silver Medal.

ROBIN BEACH, Durham.

SENIOR STANDING HIGHEST IN THE MILITARY DEPARTMENT.

PHILROY C. GALE, Concord.

WINNERS OF INDIVIDUAL PRIZE DRILL.

Gold Medal.

ARNOLD J. GRANT, '15, Dover.

Silver Medal.

ESTON L. BLAKE, '16, Gilmanton.

Bronze Medal.

JOHN S. ELLIOTT, '15, Madbury.

PRIZE SABER—EXCELLENCE IN DRILL.

JAMES A. TUFTS, JR., '14, Exeter.

Honorable Mention.

TIMOTHY P. REARDON, '14, Concord.

JOHN E. DAVIS, '14, Portsmouth.

SENIORS REPORTED TO THE ADJUTANT-GENERAL OF THE
ARMY FOR APTITUDE IN DRILL.

PHILROY C. GALE, Concord.

CHARLES H. ROGERS, Exeter.

THOMAS J. TWOMEY, Concord.

COLOR COMPANY—YEAR 1913-14.

COMPANY C.

VALENTINE SMITH SCHOLARSHIPS.

RAY WARREN COMBS, '14.

LELAND WHITNEY CRAFTS, '15.

RALPH WALDO DOEG, '16.

F. DOROTHA HATCH, '17.

ROSTER OF BATTALION.

For 1913-1914.

COMMANDANT.

FIRST LIEUTENANT C. A. HUNT, United States Infantry.

CADET OFFICERS AND NON-COMMISSIONED OFFICERS

FIELD AND STAFF.

Major, J. A. TUFTS, JR.

First Lieutenant, J. E. DAVIS, *Adjutant*.Second Lieutenant, B. WOODWARD, *Quartermaster*.

Sergeant Major, B. B. FERNALD.

Quartermaster Sergeant, J. L. GRADY.

Color Sergeants, J. F. HOBBS, C. A. REED.

Physical Director.

Second Lieutenant, C. G. PAULSON.

BAND.

Chief Musician, M. J. BROGGINI.
Principal Musician, W. S. BARTLETT.
Drum Major, A. L. MURDOCH.

Sergeants.

J. H. ANNIS.
R. W. GARLAND.

Corporals.

E. L. SANBORN.
E. H. DOWNING.

C. A. WEIGEL.
F. S. MANTER.

G. B. ARNOLD.

COMPANY A.

Captain, P. T. SELLERS.
First Lieutenant, J. S. ELLIOTT.
Second Lieutenant, C. W. DAVIS.
First Sergeant, R. E. CAME.

Sergeants.

A. E. BARTLETT.
R. C. BOWDEN.

W. I. WAITE.
G. W. BURKE.

Corporals.

W. J. NELSON.
M. R. MCGREAL.

L. W. DAVIS.
P. W. WATSON.

V. A. PERKINS.

Musician.

S. W. DYER.

COMPANY B.

Captain L. D. JESSEMAN.
First Lieutenant, A. J. GRANT.
Second Lieutenant, R. A. KNIGHT.
First Sergeant, K. F. RAND.

Sergeants.

J. I. GARSIDE.
H. L. FARNHAM.

R. H. KINDER.
S. H. FOGG.

Corporals.

E. L. BLAKE.
A. O. MCCARTNEY.

C. S. PETTEE.
W. T. TAPLEY.

E. D. FULLER.

Musician.

L. F. BROWN.

COMPANY C.

Captain, T. P. REARDON.
 First Lieutenant, J. F. THOMPSON.
 Second Lieutenant, P. S. WILLAND.
 First Sergeant, E. E. WATSON.

Sergeants.

W. F. PARKER.
 W. W. SWETT.

W. H. BARR.
 N. C. HURD.

Corporals.

D. P. CROCKETT.
 L. A. HAWKINS.

G. W. CHASE.
 H. E. SWAIN.

K. E. SAWYER.

Musician.

H. S. BROWN.

COMPANY D.

Captain, F. C. SMITH.
 First Lieutenant, T. P. DUSTIN.
 Second Lieutenant, P. E. CORRIVEAU.
 First Sergeant, J. A. DODGE.

Sergeants.

G. C. Bishop.
 H. G. WOODMAN.

A. E. MOSHER.
 R. H. BISSELL.

Corporals.

E. J. MCKENZIE.
 C. R. DANIELS.
 W. MARAT.

C. D. GUMMERSON
 L. A. MERRILL.
 W. T. PHAIR.

Musician.

E. LITTLE.

STUDENTS.

a. h. and *d.*—Animal Husbandry and Dairy course; *for.*—Forestry course; *hort.*—Horticultural course; *gen. a.*—General Agricultural course; Freshmen and Sophomores in the agricultural course are designated by *a.* only. *c.*—Chemical Engineering course; *m. e.*—Mechanical Engineering course; *e. e.*—Electrical Engineering course; Freshmen,

Sophomores and Juniors in the electrical and mechanical engineering courses are designated by *e.* only; *a.* and *s.*—General Arts and Science course; *h. e.*—Home Economics course; *m. a.*—Mechanic Arts course; *u.*—Unclassified.

GRADUATE STUDENTS.

Name.	P. O. Address.
Batchelder, Charles Howard, B.S.	<i>Seabrook.</i>
Holden, Hiram Chester, B.S.	<i>Manchester.</i>
Templeton, Marion Elizabeth, A.B.	<i>Exeter.</i>

SENIORS.

Name.	P. O. Address.
Annis, John Harold, <i>a.</i> and <i>s.</i>	<i>Manchester.</i>
Bent, Horace Victor, <i>a. h.</i> and <i>d.</i>	<i>Durham.</i>
Bissell, Don Warren, <i>c.</i>	<i>Keene.</i>
Blake, Percival Moulton, <i>a.</i> and <i>s.</i>	<i>Hampton.</i>
Brackett, William Henry Langdon, <i>a.</i> and <i>s.</i>	<i>Greenland.</i>
Combs, Ray Warren, <i>hort.</i>	<i>Hampton Falls.</i>
Davis, John Edgar, <i>a.</i> and <i>s.</i>	<i>Portsmouth.</i>
Dresser, Clarence Jewell, <i>e. e.</i>	<i>Berlin.</i>
Eastman, Harold Moses, <i>c.</i>	<i>Franklin.</i>
Garland, Russell White, <i>m. a.</i>	<i>Manchester.</i>
Halvorsen, George Arthur, <i>a.</i> and <i>s.</i>	<i>Berlin.</i>
Ham, Guy Leslie, <i>c.</i>	<i>Tuftonborough.</i>
Heath, Carroll Richard, <i>c.</i>	<i>South Danville.</i>
Jesseman, Leroy Dexter, <i>gen. a.</i>	<i>Franconia.</i>
Krook, William Cleon, <i>a.</i> and <i>s.</i>	<i>Durham.</i>
Ladd, Daniel Watson, Jr., <i>a.</i> and <i>s.</i>	<i>Epping.</i>
McCartney, Howard Ranson, <i>a.</i> and <i>s.</i>	<i>Kingston.</i>
McCrillis, Neal, <i>gen. a.</i>	<i>Whiteface.</i>
Neal, Cecil Maurice, <i>a.</i> and <i>s.</i>	<i>Portsmouth.</i>
Nudd, Frances Augusta, <i>a.</i> and <i>s.</i>	<i>Hampton.</i>
Osgood, Wilfred Albro, <i>a.</i> and <i>s.</i>	<i>Windham.</i>
Perkins, Gerald Nye, <i>e. e.</i>	<i>Claremont.</i>
Pinkham, Valentine, <i>a.</i> and <i>s.</i>	<i>Dover.</i>
Place, Walter Roy, <i>m. e.</i>	<i>Alton.</i>
Reardon, Timothy Patrick, <i>a.</i> and <i>s.</i>	<i>Concord.</i>
Riford, Lloyd Stephen, <i>a. h.</i> and <i>d.</i>	<i>Lakeport.</i>
Sanborn, Howard Weaver, <i>u.</i>	<i>Lochmere.</i>
Sellers, Paul Thornton, <i>a.</i> and <i>s.</i>	<i>Franklin.</i>
Smart, Raymond Woodus, <i>e. e.</i>	<i>Dover.</i>
Smith, Fred Carl, <i>e. e.</i>	<i>Durham.</i>
Taylor, John Walter, <i>a.</i> and <i>s.</i>	<i>North Walpole.</i>

Name.	P. O. Address.
Tufts, James Arthur, Jr., <i>u.</i>	<i>Exeter.</i>
Wilder Wallace Whittier, <i>gen. a.</i>	<i>Durham.</i>
Woodward, Bernard, <i>e. e.</i>	<i>Lancaster.</i>
Yaxis, Themistocles George, <i>gen. a.</i>	<i>Kingston.</i>

JUNIORS.

Name.	P. O. Address.
Arthur, Walter Edward, <i>e.</i>	<i>Manchester.</i>
Bartlett, Arnold Eastman, <i>a. and s.</i>	<i>Manchester.</i>
Bartlett, William Sanborn, <i>e.</i>	<i>Manchester.</i>
Bean, Raymond Jackson, <i>a. and s.</i>	<i>Laconia.</i>
Bonardi, Jack, <i>c.</i>	<i>Lebanon,</i>
Bowden, Raymond Charles, <i>a. and s.</i>	<i>York Beach, Me.</i>
Broggini, Mario James, <i>c.</i>	<i>Milford.</i>
Bronson, Forrest Dinsmore, <i>a. and s.</i>	<i>Lisbon.</i>
Brown, Leon Frank, <i>gen. a.</i>	<i>Rochester.</i>
Came, Ralph Elbert, <i>a. and s.</i>	<i>Rochester.</i>
Clark, Byron Humphrey, <i>a. and s.</i>	<i>Manchester.</i>
Corriveau, Paul Edward, <i>hort.</i>	<i>Concord.</i>
Crafts, Leland Whitney, <i>a. and s.</i>	<i>Newfields.</i>
Davis, Charles Wesley, <i>c.</i>	<i>Concord.</i>
Dearth, Raymond Edson, <i>a. h. and d.</i>	<i>North Haverhill.</i>
Dustin, True Page, <i>e.</i>	<i>Berlin.</i>
Elliott, John Spaulding, <i>a. h. and d.</i>	<i>Madbury.</i>
Emerson, Stuart Baker, <i>a. and s.</i>	<i>Lebanon.</i>
Farnham, Harry Lothrop, <i>e.</i>	<i>Dover.</i>
Fernald, Brackett Britton, <i>gen. a.</i>	<i>Rochester.</i>
Fogg, Sherburne Hilliard, <i>for.</i>	<i>Durham.</i>
Gamash, Albert William, <i>for.</i>	<i>Manchester.</i>
Garside, John Ingraham, <i>e.</i>	<i>Dover.</i>
Grady, John Leo, <i>e.</i>	<i>Dover.</i>
Grant, Arnold Jay, <i>c.</i>	<i>Dover.</i>
Haines, Ray Edward, <i>m. a.</i>	<i>Lakeport.</i>
Halvorsen, Henry Olaf, <i>a. and s.</i>	<i>Berlin.</i>
Hobbs, James Francis, Jr., <i>a. and s.</i>	<i>North Hampton.</i>
Hoitt, Alice Joanna, <i>a. and s.</i>	<i>Durham.</i>
Hoitt, Carrie Elizabeth, <i>a. and s.</i>	<i>Durham.</i>
Hopkins, Anna Morse, <i>a. and s.</i>	<i>Lakeport.</i>
Jenkins, Everett Kelly, <i>m. a.</i>	<i>Loudon.</i>
Key, Yuling George, <i>c.</i>	<i>Shanghai, China.</i>
Kinder, Roland Hugh, <i>a. and s.</i>	<i>Marlborough.</i>
Knight, Richard Adams, <i>m. a.</i>	<i>West Concord.</i>
Langley, Lester Libbey, <i>a. and s.</i>	<i>Durham.</i>
Loomis, Glenn Moore, <i>e.</i>	<i>Goffs Falls.</i>

Name.	P. O. Address.
McCartney Arthur Orcutt, <i>a. h. and d.</i>	<i>Kingston.</i>
McKone, Esther Gradys, <i>a. and s.</i>	<i>Dover.</i>
Montgomery, Earl Roger, <i>a. and s.</i>	<i>Contoocook.</i>
Murdoch, Armand Leigh, <i>a. and s.</i>	<i>Dover.</i>
Murphy, Mary Frances, <i>a. and s.</i>	<i>Somersworth</i>
Nash, Marion Edgerly, <i>a. and s.</i>	<i>Dover.</i>
Odiorne, Benjamin Gilbert, <i>a. and s.</i>	<i>Rye.</i>
Paige, Laura Jane, <i>a. and s.</i>	<i>Goffstown.</i>
Parker, Walter Francis, <i>a. and s.</i>	<i>Antrim.</i>
Paulson, Carl Gustav, <i>e.</i>	<i>Berlin Mills.</i>
Plumer, Helen Waldron, <i>a. and s.</i>	<i>R. D., Dover.</i>
Reed, Clinton Arthur, <i>a. and s.</i>	<i>Manchester.</i>
Sawyer, Clifford Augustus, <i>a. h. and d.</i>	<i>Atkinson.</i>
Story, Irving Chellis, <i>a. and s.</i>	<i>Claremont.</i>
Studd, George Thomas, <i>a. and s.</i>	<i>Berlin.</i>
Swett, Walter Whittier, <i>a. h. and d.</i>	<i>Gossville.</i>
Thompson, John Fawdrey, <i>c.</i>	<i>Tilton.</i>
Waldron, Lena Vernice, <i>a. and s.</i>	<i>Center Strafford.</i>
Welsh, Russell Hamilton, <i>gen. a.</i>	<i>Exeter.</i>
Willand, Pitt Sawyer, <i>c.</i>	<i>Dover.</i>

SOPHOMORES.

Name	P. O. Address
Archibald, Clyde Warren, <i>e.</i>	<i>Portsmouth.</i>
Barr, William Henry, <i>e.</i>	<i>Durham.</i>
Blake, Eston Lloyd, <i>a.</i>	<i>Durham.</i>
Brown, Harold Sunderlin, <i>m. a.</i>	<i>Manchester.</i>
Brown, Lloyd Ridley, <i>a. and s.</i>	<i>Concord.</i>
Brown, Oscar Choate, <i>c.</i>	<i>Lebanon.</i>
Bugbee, Ralph Josiah, <i>a.</i>	<i>Claremont.</i>
Burbee, Clifford Hardy, <i>a. and s.</i>	<i>Nashua.</i>
Burke, George Wilbur, <i>c.</i>	<i>Concord.</i>
Burt, Perry Warren, <i>a.</i>	<i>Westmoreland.</i>
Chamberlain, Walter E., <i>a.</i>	<i>Durham.</i>
Charbonneau, Genevieve Adrienne Jeannette, <i>a. and s.</i>	<i>Nashua.</i>
Chase, Guy Wetherbee, <i>m. a.</i>	<i>Londonderry.</i>
Coffin, Alice Veva, <i>h. e.</i>	<i>Boscawen.</i>
Crockett, Dura Prescott, <i>a.</i>	<i>New London.</i>
Crouch, Leon Meader, <i>e.</i>	<i>R. D., Durham.</i>
Davis, Leland Worthen, <i>e.</i>	<i>Concord.</i>
Diettrich, Rosina Martha, <i>a. and s.</i>	<i>Hampton.</i>
Doeg, Ralph Waldo, <i>e.</i>	<i>Exeter.</i>
Downing, Edward Hugh, <i>m. a.</i>	<i>Alton Bay.</i>

Name.	P. O. Address.
Dudley, Florence Lillian, <i>a. and s.</i>	<i>Reed's Ferry.</i>
Dudley, Marion Grace, <i>a. and s.</i>	<i>R. D. 1, Newmarket.</i>
Dwight, Bernard Henry, <i>a. and s.</i>	<i>Manchester.</i>
Dyer, Stephen Webster, <i>a.</i>	<i>Lawrence, Mass.</i>
Ellsworth, Frank Drew, <i>a.</i>	<i>Pembroke.</i>
Finley, Nettie Edith Austin, <i>a. and s.</i>	<i>Dover.</i>
Flanders, Mildred Maleham, <i>a. and s.</i>	<i>Rochester.</i>
Fuller, Edward Deering, <i>c.</i>	<i>Atkinson.</i>
Goodwin, Daniel Henry, <i>a.</i>	<i>Hollis</i>
Hadley, John Corbin, <i>a.</i>	<i>Durham.</i>
Hallisey, Helen Agnes, <i>a. and s.</i>	<i>Nashua.</i>
Hawkins, Leon Abbott, <i>a.</i>	<i>Plymouth.</i>
Hayden, Philip A., <i>a.</i>	<i>Hollis.</i>
Hayes, Robert Foss, <i>e.</i>	<i>R. D., Dover.</i>
Howard, Wesley Everett, Jr., <i>a.</i>	<i>Belmont.</i>
Hurd, Norman Cannavan, <i>e.</i>	<i>Dover.</i>
Jenness, Marion Ruth, <i>a. and s.</i>	<i>Dover.</i>
Johnson, Stephen Guy, <i>a.</i>	<i>Winchester.</i>
Jones, Flavia Locke, <i>a. and s.</i>	<i>Exeter.</i>
Kelley, Everette Harmon, <i>a.</i>	<i>Barnstead.</i>
Kidder, Harold Soule, <i>c.</i>	<i>Durham.</i>
Lary, John Dana, Jr., <i>e.</i>	<i>Berlin.</i>
McCartney, Robert Irving, <i>a. and s.</i>	<i>Kingston.</i>
McDuffee, Edward Clarence, <i>e.</i>	<i>Claremont.</i>
McGreal, Michael Reilly, <i>a. and s.</i>	<i>Somersworth.</i>
Manter, Frederick Sanford, <i>e.</i>	<i>Manchester.</i>
Mazmanian, Misak Minas, <i>a.</i>	<i>Durham.</i>
Mitchell, Marion Edwena, <i>a. and s.</i>	<i>Newmarket.</i>
Morse, Stephen Noyes, <i>e.</i>	<i>Ashland.</i>
Nelson, George Albert, <i>a. and s.</i>	<i>Exeter.</i>
Nelson, Westly Joseph, <i>a.</i>	<i>Manchester.</i>
Parker, Ralph Harthan, <i>a. and s.</i>	<i>Kingston.</i>
Partington, William Remick, <i>e.</i>	<i>Portsmouth.</i>
Pennell, Philip, <i>c.</i>	<i>Gossville.</i>
Perkins, Vincent Aubert, <i>a.</i>	<i>Claremont.</i>
Pettee, Charles Swett, <i>a. and s.</i>	<i>Durham.</i>
Philbrick, Leonard Parker, <i>a. and s.</i>	<i>North Hampton.</i>
Poland, Nellie Guild, <i>h. e.</i>	<i>Lebanon.</i>
Purinton, James Alson, <i>a.</i>	<i>Hopkinton.</i>
Reed, Bernice, <i>a. and s.</i>	<i>Grantham.</i>
Robinson, Lewis Byron, <i>a.</i>	<i>R. D., Concord.</i>
Runnals, Herbert Richard, <i>a.</i>	<i>West Lebanon.</i>
Sanborn, Eldred Louis, <i>m. a.</i>	<i>Lochmere.</i>
Sargent, Neil Abner, <i>c.</i>	<i>Concord.</i>

Name.	P. O. Address.
Sawyer, Kenneth Earl, <i>e.</i>	<i>Manchester.</i>
Scruton, Herbert Ambrose, <i>e.</i>	<i>Dover.</i>
Smith, Robert Carl, <i>a.</i> and <i>s.</i>	<i>Exeter.</i>
Smith, Victor Haskell, <i>a.</i>	<i>Hudson.</i>
Steele, Harold Arthur, <i>a.</i> and <i>s.</i>	<i>Manchester.</i>
Sullivan, Joseph Albert, <i>a.</i>	<i>Dover.</i>
Swain, Howard Eugene, <i>e.</i>	<i>Exeter.</i>
Swett, Earle Frederick, <i>a.</i> and <i>s.</i>	<i>Andover.</i>
Tapley, William Thorpe, <i>a.</i>	<i>Revere, Mass.</i>
Torrey, Robert Jordan, <i>a.</i> and <i>s.</i>	<i>Putnam, Conn.</i>
Waite, Walter Ira, <i>c.</i>	<i>Concord.</i>
Waldron, Carroll Charles, <i>m. a.</i>	<i>Center Strafford.</i>
Waldron, Etta Seward, <i>a.</i> and <i>s.</i>	<i>Center Strafford.</i>
Ward, Paul Stanwood, <i>a.</i> and <i>s.</i>	<i>Nashua.</i>
Watson, Earle Elwin, <i>a.</i>	<i>Durham.</i>
Watson, Philip Wilder, <i>m. a.</i>	<i>Durham.</i>
Weigel, Charles Adolph, <i>a.</i>	<i>Durham.</i>
White, Nellie Lydia, <i>a.</i> and <i>s.</i>	<i>Enfield.</i>
Whitehead, Carl Rollins, <i>e.</i>	<i>South Berwick, Me.</i>
Wilson, John Parker, <i>a.</i> and <i>s.</i>	<i>Lancaster.</i>
Work, Olin Charles <i>m. a.</i>	<i>Exeter.</i>
Yeaton, Russell Stewart, <i>a.</i>	<i>Short Falls.</i>

FRESHMEN.

Name	P. O. Address
Anderton, Thomas Richard, <i>c.</i>	<i>Dover.</i>
Andrews, Wayland Francis, <i>c.</i>	<i>Newburyport, Mass.</i>
Basch, Goldie, <i>a.</i> and <i>s.</i>	<i>Ashuelot.</i>
Batchelor, Vance Whiting, <i>a.</i> and <i>s.</i>	<i>West Upton, Mass.</i>
Bennett, Frank Powers, <i>c.</i>	<i>Northwood.</i>
Blanchard, Phyllis Mary, <i>a.</i> and <i>s.</i>	<i>Epping.</i>
Bond, Charles Chester, <i>a.</i> and <i>s.</i>	<i>Lisbon.</i>
Boutwell, Leroy Arthur, <i>e.</i>	<i>Hopkinton</i>
Brackett, Josephine Edwards, <i>h. e.</i>	<i>Concord.</i>
Brown, Willard Irving, <i>a.</i>	<i>R. D., Ashland.</i>
Burleigh, Arthur Samuel, <i>e.</i>	<i>Ossipee.</i>
Burpee, Louise Elizabeth, <i>h. e.</i>	<i>Manchester.</i>
Caldwell, William Rice, <i>a.</i> and <i>s.</i>	<i>Peterborough.</i>
Carlisle, Sumner, <i>a.</i> and <i>s.</i>	<i>Exeter.</i>
Caswell, Henry Benson, <i>c.</i>	<i>R. D., Barnstead.</i>
Chase, Marion Olive, <i>a.</i> and <i>s.</i>	<i>Seabrook.</i>
Cilley, Melissa Annis, <i>a.</i> and <i>s.</i>	<i>Colebrook.</i>
Clark, Malcolm Barrett, <i>a.</i>	<i>Bethlehem.</i>

Name.	P. O. Address.
Cochran, Olin John, <i>a.</i>	<i>Windham Depot.</i>
Colby, Rachel Clarendia, <i>h. e.</i>	<i>New Boston.</i>
Colomy, James Daniel, <i>a.</i>	<i>Durham.</i>
Conner, Bessie Freda, <i>h. e.</i>	<i>Exeter.</i>
Connor, Aloysius Joseph, <i>e.</i>	<i>Manchester.</i>
Crandall, Flora Lou, <i>h. e.</i>	<i>Lebanon.</i>
Cutts, Elmer Frank, <i>e.</i>	<i>Manchester.</i>
Dixon, Charles Albert, <i>a. and s.</i>	<i>Rochester.</i>
Dudley, William Allen, <i>e.</i>	<i>Colebrook.</i>
Dustin, Clifton Henry, <i>e.</i>	<i>Rochester.</i>
Evans, George Everett, <i>c.</i>	<i>East Kingston.</i>
Ewer, Natalie Drew, <i>a. and s.</i>	<i>Dover.</i>
Fall, Beatrice Louise, <i>a. and s.</i>	<i>Dover.</i>
Fernald, Alice, <i>h. e.</i>	<i>Dover.</i>
Fernald, Isabel Jane, <i>h. e.</i>	<i>Dover.</i>
Fitch, Frank Williams, <i>a.</i>	<i>R. D., Windsor, Vt.</i>
Foss, George Harold, <i>a. and s.</i>	<i>Warner.</i>
French, Roger Lee, <i>c.</i>	<i>Plymouth.</i>
Frisbee, Joseph Elliot, <i>e.</i>	<i>Portsmouth.</i>
Gilson, Marion Susan, <i>h. e.</i>	<i>Windham.</i>
Glidden, Chester Willis, <i>c.</i>	<i>Alton Bay.</i>
Graham, Clifford Lloyd, <i>a.</i>	<i>Candia.</i>
Graham, Roy Charles Lemach, <i>a.</i>	<i>Candia.</i>
Griffin, Philip Joseph, <i>c.</i>	<i>Portsmouth.</i>
Hardy, Verna Carola, <i>a. and s.</i>	<i>Concord.</i>
Harriman, Nathaniel Joy, <i>a. and s.</i>	<i>Laconia.</i>
Haseltine, Franklin L., <i>a.</i>	<i>Reed's Ferry.</i>
Hatch, Frances Dorothea, <i>a. and s.</i>	<i>Exeter.</i>
Hodgdon, Robert Edgar, <i>e.</i>	<i>Rochester.</i>
Hoyt, Willis H., <i>a.</i>	<i>Newington.</i>
Hubbard, Guy, <i>e.</i>	<i>Windsor, Vt.</i>
Jenkins, Harvey Foss, <i>a.</i>	<i>Manchester.</i>
Johnson, Ellsworth Sheldon, <i>a.</i>	<i>Springfield, Vt.</i>
Johnson, Myrtle May, <i>a. and s.</i>	<i>Reed's Ferry.</i>
Johnson, Sadie Brown, <i>h. e.</i>	<i>Petersham, Mass.</i>
Knox, Warren Penn, <i>a.</i>	<i>Dover.</i>
Lake, Leroy Moses, <i>a.</i>	<i>Brentwood.</i>
Lambert, Eleanor Hurst, <i>a. and s.</i>	<i>Durham.</i>
Langley, Mary Anthony, <i>h. e.</i>	<i>Durham.</i>
Little, Harold Benjamin, <i>a.</i>	<i>Colebrook.</i>
Lombard, Carl Weston, <i>c.</i>	<i>Newburyport, Mass.</i>
Long, Edward, <i>c.</i>	<i>R. D., Dover.</i>
Lord, Eugene Hodgdon, <i>e.</i>	<i>Hopkinton.</i>
Lumsden, Florence, <i>h. e.</i>	<i>Durham.</i>

Name.	P. O. Address.
McDonald, James Murdo, <i>a. and s.</i>	<i>Hanover.</i>
McKone, Bernice Stearns, <i>h. e.</i>	<i>Dover.</i>
Mack, Lillian Wallace, <i>h. e.</i>	<i>Derry.</i>
Meserve, Harlan Ray, <i>a. and s.</i>	<i>Rochester.</i>
Miller, George Willard, <i>a.</i>	<i>South Berwick, Me.</i>
Moore, William Edward, Jr., <i>a.</i>	<i>R. D., Exeter.</i>
Morgan, Arthur Richardson, <i>a.</i>	<i>Durham.</i>
Morrill, Moses Winthrop, <i>e.</i>	<i>Berwick, Me.</i>
Nelson, Rufus Lawrence, <i>e.</i>	<i>Tilton.</i>
Nichols, Earle Brazil, <i>a.</i>	<i>Newton.</i>
Nixon, Leonard Russell, <i>a.</i>	<i>R. F. D. Exeter.</i>
Nudd, Henrietta Carleton <i>h. e.</i>	<i>Hampton.</i>
O'Brien, William Henry, <i>e.</i>	<i>Walpole.</i>
Page, George Haines, <i>a. and s.</i>	<i>Dover.</i>
Parnell, George Downes, <i>e.</i>	<i>Manchester.</i>
Pitman, Ralph Read, <i>a. and s.</i>	<i>Durham.</i>
Poland, Charles Wesley, <i>a.</i>	<i>Lebanon.</i>
Reed, Beatrice, <i>h. e.</i>	<i>Grantham.</i>
Roberts, Julia Aurelia, <i>h. e.</i>	<i>Durham.</i>
Roberts, Ray Towle, <i>e.</i>	<i>West Concord.</i>
Robinson, Harold Chester, <i>a.</i>	<i>Manchester.</i>
Robinson, Nathaniel Edwin, <i>a. and s.</i>	<i>R. D., Concord.</i>
Rollins, John Hooper, <i>c.</i>	<i>Dover.</i>
Ross, Edgar Samuel, <i>e.</i>	<i>Nashua.</i>
Russell, Hansel Arthur, <i>a.</i>	<i>Lebanon.</i>
Shannon, Clarice Henrietta, <i>h. e.</i>	<i>Laconia.</i>
Sinclair, Philip Raymond, <i>e.</i>	<i>Ossipee.</i>
Smith, Albert Eaton, <i>a.</i>	<i>Hudson.</i>
Steuerwald, Alberta Neal, <i>h. e.</i>	<i>Dover.</i>
Stevens, Clark Leavitt, <i>a.</i>	<i>Colebrook.</i>
Sussman, Joseph Abraham, <i>c.</i>	<i>Portsmouth.</i>
Tebbetts, Marion Ruth, <i>h. e.</i>	<i>Berwick, Me.</i>
Thomas, William Herve, <i>a.</i>	<i>Franconia.</i>
Tibbetts, Carleton Briggs, <i>c.</i>	<i>Somersworth.</i>
Tilton, Helen Florence, <i>h. e.</i>	<i>Auburn.</i>
Turcotte, Abby Jewett, <i>h. e.</i>	<i>Lakeport.</i>
Ubertini, Umberto, <i>a.</i>	<i>Durham.</i>
Wentworth, Sidney Warren, <i>a.</i>	<i>Hollis.</i>
Weston, Fred Webster, <i>a. and s.</i>	<i>Lisbon.</i>
Weston, Helen Brown, <i>h. e.</i>	<i>Lisbon.</i>
Westover, Kyle Chester, <i>a.</i>	<i>Manchester.</i>
Wheeler, George Arthur, <i>a.</i>	<i>Petersham, Mass.</i>
Whitham, Frederick, <i>e.</i>	<i>Berlin.</i>
Whittemore, Arthur Benjamin, <i>a. and s.</i>	<i>Colebrook.</i>

Name.	P. O. Address.
Wiggin, Edwin Albert, <i>e.</i>	<i>Exeter.</i>
Wiggin, Rohl Chase, <i>c.</i>	<i>Concord.</i>
Wildey, Paul Brooks, <i>a.</i> and <i>s.</i>	<i>Meriden.</i>
Worcester, Mary Abbie, <i>h. e.</i>	<i>Berwick, Me.</i>

SPECIALS.

Name	P. O. Address
Baghdigian, Bagdasar Krekor,	<i>Chester.</i>
Curry, Myrtle,	<i>Bloomington, Ind.</i>
Fairchild, Louise May,	<i>Durham.</i>
Hayes, John Paul, Jr.,	<i>R. D. Dover.</i>
Kendall, Marjorie Foster,	<i>Durham.</i>
Rand, Karl Fowler,	<i>Short Falls.</i>
Sawyer, Elizabeth Coffin,	<i>Dover.</i>
Scott, Susie Helen,	<i>Durham.</i>
Varney, Wallace Gallinger,	<i>Dover.</i>

TWO-YEAR COURSE.

Second Year.

Name.	P. O. Address.
Arnold, Francis Herbert,	<i>North Pembroke, Mass.</i>
Arnold, George Bartlett,	<i>Stoneham, Mass.</i>
Ayer, Ross Alvin,	<i>Marlow.</i>
Bishop, Clifton Louis,	<i>Lisbon.</i>
Bishop, George Cornelius,	<i>Center Sandwich.</i>
Bissell, Ralph Howard,	<i>Keene.</i>
Brailsford, Albert,	<i>Durham.</i>
Cram, Arthur T.,	<i>Clinton Grove.</i>
Daniels, Carleton Richards,	<i>Durham.</i>
Dodge, James Arthur,	<i>Concord.</i>
Dodge, Rodney Marston,	<i>Beverly, Mass.</i>
Farrington, Wendell Maynard,	<i>Milton, Mass.</i>
Groves, Reuben Spaulding,	<i>R. D., Nashua.</i>
Gummerson, Claron D.,	<i>Jaffrey</i>
Holmes, Russell Herbert,	<i>Charlestown.</i>
Jaquith, Hollis Proctor,	<i>New Ipswich.</i>
Jaquith, Milo Warren,	<i>New Ipswich.</i>
Lane, Harold William,	<i>Lancaster.</i>
McCarten, William Leonard,	<i>Lancaster.</i>
McKenzie, Edward J.,	<i>Franconia.</i>
Marat, Walter,	<i>Durham.</i>
Merrill, Leonard Abbott,	<i>Antrim.</i>

Name.	P. O. Address.
Mosher, Albert Erlon,	<i>Gorham, Me.</i>
Nelson, Ernest S.,	<i>Mill Village.</i>
Paul, Edward Alexander,	<i>Meredith.</i>
Phair, William Thomas,	<i>Warren.</i>
Woodman, Harold Graham,	<i>Durham.</i>

First Year.

Alexander, Arthur Lloyd,	<i>Sunapee.</i>
Allen, Arthur Volney,	<i>R. D., Manchester.</i>
Allen, Merritt,	<i>Spofford.</i>
Bennett, Ellwood Vance,	<i>Laconia.</i>
Brackett, Edwin L.,	<i>Concord.</i>
Brackett, Ralph de Rochemont,	<i>Greenland.</i>
Campbell, George William,	<i>Exeter.</i>
Chadwick, Paul Archie,	<i>North Sutton.</i>
Clow, Arthur Stephen,	<i>East Wolfeboro.</i>
Colprit, James Elwin,	<i>R. D., Dover.</i>
Cram, Theodore Francis,	<i>Durham.</i>
Crosby, Robert Frank,	<i>Francestown.</i>
Cross, Kenneth John,	<i>Manchester.</i>
Cummings, Charles,	<i>Colebrook.</i>
Field, Paul Joscp, Jr.,	<i>Nashua.</i>
Green, Henry Lawrence, Jr.,	<i>Portsmouth.</i>
Green, Philip Burleigh,	<i>Portsmouth.</i>
Green, Sidney James,	<i>Munsonville.</i>
Hale, Henry Matthew,	<i>Wolfeboro.</i>
Hall, Elmer Oliver,	<i>West Lebanon.</i>
Hall, Robert Hancock,	<i>Waverley, Mass.</i>
Harriman, Samuel R.,	<i>Colebrook.</i>
Hartt, John,	<i>Newport.</i>
Hayes, Allen Nowell,	<i>R. D., Dover.</i>
Hazen, Gardner Williamson	<i>Andover.</i>
Humiston, Frank,	<i>East Jaffrey.</i>
Huse, Raymond Warren,	<i>Manchester.</i>
Jones, Ralph Walter,	<i>Concord.</i>
Keep, John Marcus,	<i>North Conway.</i>
Kennett, Clarence Ralph,	<i>Silver Lake.</i>
LaPoint, William,	<i>Spofford.</i>
Learmonth, John Gullion,	<i>Salem Depot.</i>
Little, Edgar,	<i>Webster.</i>
McCabe, Leslie Walker,	<i>Henniker.</i>
McClure, Kenneth Donald,	<i>Munsonville.</i>
McKenzie, Robert J.,	<i>Franconia.</i>
McMahon, Martin Francis,	<i>Concord.</i>

Name.	P. O. Address.
Marden, Ralph Wilson,	<i>Newton.</i>
Miller, Charles Frank,	<i>Lawrence, Mass.</i>
Morse, Oscar Varnum,	<i>E. Hebron.</i>
Moss, Harold,	<i>Wolfeboro.</i>
Osborne, John Fred,	<i>R. D., Pittsfield,</i>
Perkins, James Fiske,	<i>Marlow.</i>
Price, Fishel,	<i>Wolfeboro.</i>
Redden, Dennis Christophor,	<i>Dover.</i>
Runnals, George Alvin,	<i>West Lebanon.</i>
Sanborn, Alfred Natt,	<i>Auburn.</i>
Sawyer, Maurice Wade,	<i>Lakeport.</i>
Seymour, George Walter,	<i>Pierce Bridge.</i>
Smith, Perley Jaques,	<i>Lochmere.</i>
Tibbetts, Alvah Herbert,	<i>East Wolfeboro.</i>
Tourtelotte, Ernest Allen,	<i>Mason.</i>
Weston, Franklin Willoughby,	<i>Hudson.</i>
Whalin, Robert Alden,	<i>Greenfield.</i>
White, Chancey Walter,	<i>R. F. D., Concord.</i>
Whittier, Edward Mitchell,	<i>Franklin.</i>
Willand, Howard,	<i>North Wolfeboro.</i>
Yunggebauer, Gustave Emmert,	<i>South Merrimack.</i>

COURSES IN FRUIT GROWING AND DAIRYING.

Name.	P. O. Address.
Balch, Ralph West,	<i>Lyme.</i>
Berry, Arnold Parker,	<i>Portsmouth.</i>
Clement, Ruth Ethel,	<i>East Deering.</i>
Colson, C. Burton,	<i>Goffstown.</i>
Drown, Lawrence W.,	<i>Lyman, Me.</i>
Eastman, Ellsworth S.,	<i>East Andover.</i>
Evans, Albert Marble,	<i>Rye.</i>
Hill, Theodore Robert,	<i>Concord.</i>
Hird, John S.,	<i>Salem Depot.</i>
Mears, Fred H. B.,	<i>Derry Village.</i>
Moore, Thomas E.,	<i>Boscawen.</i>
Murphy, William,	<i>Peterborough.</i>
Owens, Alfred W.,	<i>Haverhill, Mass.</i>
Sherbut, Ralph Samuel,	<i>Newton.</i>
Taylor, Harry Eugene,	<i>Epping.</i>
Thorsell, Russell Clarence,	<i>Exeter.</i>
Wear, Charles A.,	<i>Pittsfield.</i>
Wheeler, Merton,	<i>Gilsum.</i>

TEN-WEEK COURSE, 1913.

Name.	P. O. Address.
Hawkes, Ferdinand W.,	<i>Westbrook, Me.</i>
Libby, Albert J.,	<i>Roxbury, Mass.</i>
White, Clifford E.,	<i>Gilsum.</i>
Yeaton, John Beecher,	<i>Hampton.</i>

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Graduate Students.	3
Seniors.	35
Juniors.	57
Sophomores.	86
Freshmen.	110
Special Students.	9
Students in Two-Year Course	85
Students in Fruit Growing and Dairying.	18
Students in One-Week Course.	352
Total.	755
Total (not including One-Week Course).	403

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